THE COAST ARTILLERY JOURNAL

Published as the Journal of U. S. Artillery from 1892 to 1922

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Volume 70 February, 1929 Number 2

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Authors alone are responsible for contributed articles.

The COAST ARTILLERY JOURNAL pays for original articles upon publication.

Published monthly under the supervision of the Commandant, Coast Artillery School, by direction of the Chief of Coast Artillery, for the information of the Coast Artillery personnel of the Regular Army, National Guard, and Organized Reserves.

Terms: United States, $3.00 a year; single copies, 50 cents. Canada, $3.25 a year; single copies, 55 cents. Foreign, $3.50 a year; single copies, 60 cents.

Entered as second class matter at the Post Office at Fortress Monroe, Va. Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized May 8, 1920.

Address: The COAST ARTILLERY JOURNAL, Fort Monroe, Va.

Printed by HOUSTON PRINTING AND PUBLISHING HOUSE, *Hampton, Va.*

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
FEB 1929		**00-00-1929 to 00-00-1929**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
The Coast Artillery Journal. Volume 70, Number 2, February 1929	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Coast Artillery Training Center,Coast Artillery Journal,Fort Monroe,VA,23651**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

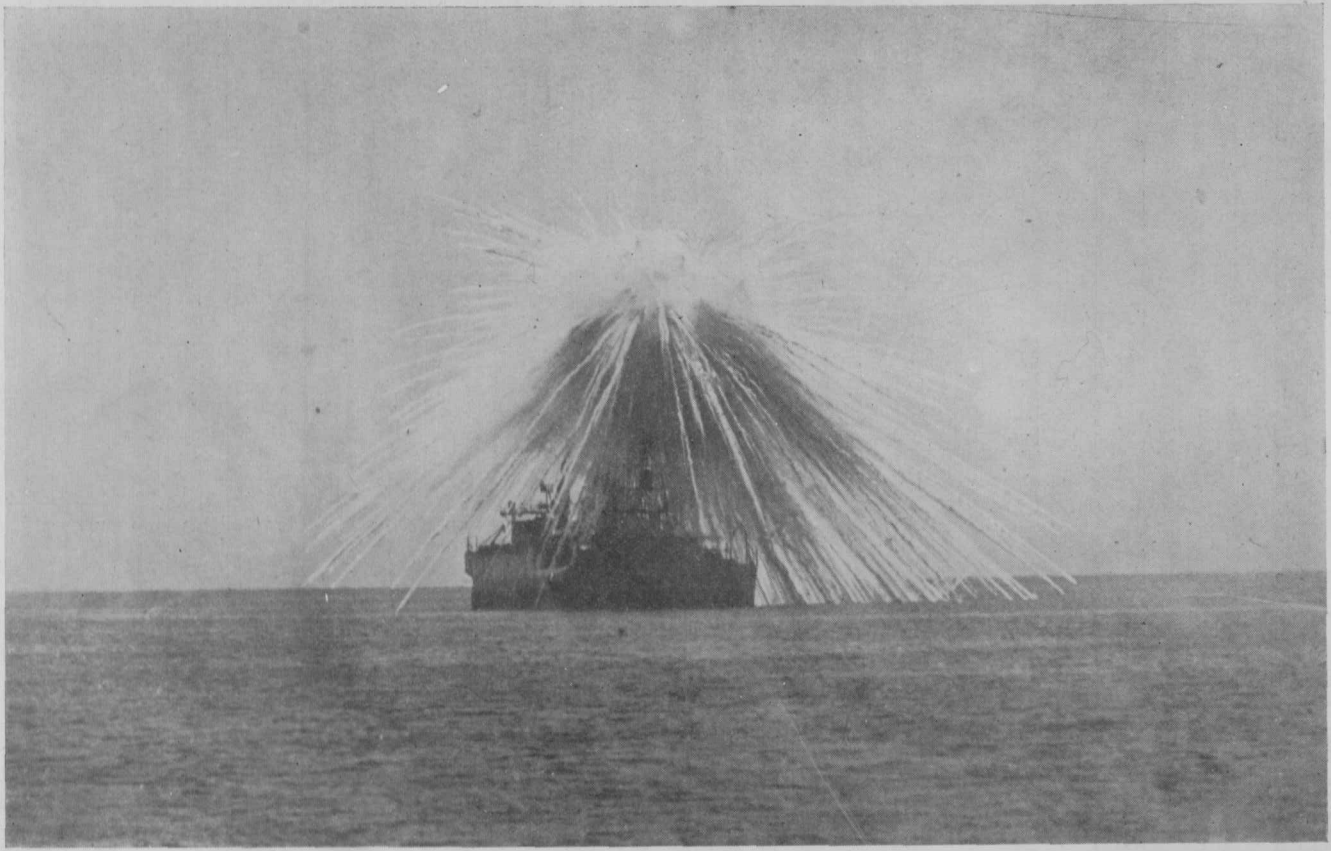
12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**Same as Report (SAR)**	**99**	



Battleship Hit By Phosphorus Bomb

THE COAST ARTILLERY JOURNAL

Volume 70 February, 1929 Number 2

Coast Artillery Board

By COLONEL W. E. COLE, C. A. C.

A statement of the early organization of the Coast Artillery Board and the changes and orders that have affected it since the date of its organization may be found in the COAST ARTILLERY JOURNAL of June, 1924, wherein is printed a lecture, "A History of the Coast Artillery Board and Its Work," by Colonel Henry J. Hatch, C. A. C., then President of the Board. The Board is at present governed by AR 90-20, 1926, of which I desire to invite attention to par. 2:

> PURPOSE.—The purpose of the Coast Artillery Board is to consider subjects pertaining to the Coast Artillery upon which the Chief of Coast Artillery may desire the board's opinion and recommendation, and to originate and submit to the Chief of Coast Artillery recommendations with a view to the improvement of the Coast Artillery Corps.

The purpose of the board as given therein has been substantially the same since its organization. With such a purpose it can readily be understood that the Coast Artillery Board has necessarily been closely associated with the development and progress of the Coast Artillery Corps. For an understanding of what this development has been I invite attention to the condition of the coast fortifications as they existed a few years after the close of the Civil War. During that war our defenses were, in general, regarded as satisfactory, but due to the adoption of rifled cannon and armored ships by the navies of the world this was no longer true nor was there any plant in this country equipped to manufacture high-powered rifled guns. In 1883 the Congress took decisive steps to remedy this condition and passed an act which authorized the appointment of a board of Army and Navy officers:

> For the purpose of examining and reporting to Congress which of the navy yards and arsenals owned by the Government has the best location and is best adapted for the establishment of a Government foundry or what other method, if any, should be adopted for the manufacture of heavy ordnance adapted to modern warfare for the use of the Army and Navy of the United States.

This Board, known as the "Gun Foundry Board," made its reports in 1884 and directed public attention, not only to the defenseless condition of our coasts, but to the importance and necessity of formulating a comprehensive scheme for the protection of our harbors and coast cities.

As a result, the Act of Congress approved March 3, 1835, provided that:

> The President of the United States shall appoint a board . . . which board shall examine and report at what ports fortifications or other defenses are must urgently required, the character and kind of defenses best adapted to each with reference to armament, the utilization of torpedoes, mines, and other defensive appliances.

The Board organized under the foregoing provision of law, popularly known as the Endicott Board, in its report of January 23, 1886, cited the principles on which any system of coast defense should be based and clearly stated the necessity of having our important strategic and commercial centers made secure against naval attack.

Public opinion was further directed to the urgent need of coast defenses by men of prominence, as shown by the following extract from a letter written by Mr. Samuel J. Tilden, on December 1, 1885, to the Hon. John G. Carlisle, afterwards Speaker of the House of Representatives, on our coast defenses:

> A still greater defect exists in our coast defenses. The range of the best modern artillery has become so extended that our present fortifications designed to protect the harbor of New York, where two-thirds of the import trade and more than one-half of the export trade of the whole United States is carried on, are too near the great populations of New York, Jersey City, and Brooklyn to be of any value as a protection.
>
> To provide effectual defenses would be the work of years. It would take much time to construct permanent fortifications. A small provision of the best modern guns would take several years. Neither of these works can be extemporized in presence of emergent danger. A million of soldiers, with the best equipments, on the heights surrounding the harbor of New York in our present state of preparation, or rather in our total want of preparation, would be powerless to resist a small squadron of war steamers.
>
> This state of things is discreditable to our foresight and to our prudence. . . .

Any one desiring to read this letter in its entirety may find a copy on file at the Coast Artillery Board.

The Treasury of the United States was well filled at this time and conditions in general were propitious for the rebuilding of our coast fortifications. Development work and experiments looking toward improvement in artillery materiel and methods devolved upon the Ordnance Department. This was stimulated by the activities of Coast Artillery officers throughout the service.

The necessity for taking early action towards strengthening our coast defenses and artillery in general was further brought home to the public by events that happened during the Spanish-American War. The need of a Chief to represent the interests of the Artillery in Washington was keenly felt. In 1901 the Artillery was reorganized with a separate Chief. That same year a board of officers was convened at Fort Wadsworth, New York, commonly known as the Wadsworth Board, for the purpose of devising a system of fire control. At this time there existed single batteries with fire-control equipment mostly improvised, but no forts or fire commands were equipped and organized so that the fire of several batteries or fire commands was subject to the will of

a single individual. It was the duty of this board to seek such an organization. This it did, and the report of the board was approved by the Board of Ordnance and Fortification. It was decided to have a test of the experimental system of fire control which they recommended at Fort Barrancas, Florida. The program for the test was prepared by Major (afterwards Colonel) G. N. Whistler, Coast Artillery Corps, was approved by the Board of Ordnance and Fortification in 1902 and had the approval of the Secretary of War. The test was completed in the spring of 1903, was comprehensive and very successful, and resulted in the standardization of much of the equipment that has been used since that date by the Coast Artillery. The general organization of the command remains today practically as it was there developed, although there are some changes in name. The Chief of Coast Artillery, Brigadier General Wallace F. Randolph, was ardent in his approval that some specific action should be taken to equip the coast fortifications with the necessary apparatus for fire-control purposes. The following is a quotation from his report on this subject:

> "Over-fortification is not good policy. Efficient handling of guns installed is an absolute necessity."

Report of the test was submitted to the Board of Ordnance and Fortification by the Chief of Coast Artillery. This report was adopted by that board and approved by Elihu Root, then Secretary of War. Fire-control equipment became a part of the installation of our fortifications.

In 1906 Theodore Roosevelt, then President of the United States, submitted to Congress a report of the National Coast Defense Board, commonly known as the Taft Board, and recommended that it receive generous support, which it did. This Board really brought the Endicott Board up to date and included recommendations for fire-control equipment as well as for guns and fortifications. That same year Brigadier General Arthur Murray, became Chief of Coast Artillery.

The year 1907 saw the separation of the Artillery into two branches, Field and Coast, and orders for the movement of the Submarine Mine School of Defense from Fort Totten, New York, to Fort Monroe, Virginia, where it was combined with the Coast Artillery School.

The officers of the Coast Artillery Board at this time, and until the World War, were acting in a dual capacity, either as heads of departments of the Coast Artillery School or as battery or fire commanders in the coast defenses. A study of the records of the Coast Artillery Board at this time indicates that it did much research work experimenting and testing matters pertaining to Artillery. Fire control and submarine mine equipment form an important part of these investigations.

There was a great deal of enthusiasm throughout the service for target practice. In 1907 a figure of efficiency, later referred to as a figure of merit, was adopted, and batteries were rated according to the figure they attained. A figure of merit in some form or other remained an important feature in target practice until our entrance into the World War.

The range at which the batteries fired were comparatively short. To show what was being done at this time I have taken the records given in Appendix A from the Emplacement Book of *Battery Parrott.*

Note the short ranges at which the firing was conducted. The best time was on the third practice—between 33 and 34 seconds per shot per gun. This time is considerably better than the average, and is better than the average time that is made today. You will note that then, as now, there was considerable time out. This is a serious defect in our firing and it is a question whether or not if no time out were allowed better results would not be obtained.

The dispersions of the first three and the fifth practices are given. You will observe that these dispersions are quite large in some instances.. In the best practice of all, that of November 16, 1907, attention is invited to the fact that six calibration shots immediately preceded the four record shots. Of this practice the Fire Commander, Major I. N. Lewis, Coast Artillery Corps, makes the following remark:

> The practice here recorded is worthy of special consideration. It is a most satisfactory demonstration of the probable value in service of this battery when manned by a trained, efficient personnel.
>
> It should be noted that firing in this instance was immediately preceded by three shots from each gun under practically known conditions the results of which had been accurately determined.

While these practices are good and did credit to the officers conducting them, we have nothing to fear by comparing them with some of our practices of today. Later I shall show a practice where the range was practically four times the average of these ranges using the same caliber of gun but on a different mount.

In 1911, General E. M. Weaver was appointed Chief of Coast Artillery. This officer had been one of the leaders in Coast Artillery training. He put into operation certain regulations that very definitely prescribed the rules for training and target practice. He prescribed the 30-second observing interval and required plotting and prediction to be done on the plotting board. In addition, he required time-range boards to be put up in the emplacements and used. He was very insistent on the carrying out of all safety precautions, caused the Drill Regulations to be revised, personally directing a large part of that revision. He inspected many of our forts and gave personal instruction to battery officers and plotters, causing curved courses to be plotted on the boards thereby testing the judgment of plotters in making predictions. He forbade adjustment of fire except from data gained as a result of trial shots fired at fixed points. At times this gave excellent results and at other times the result was a string of misses. On account of the restrictions imposed there was considerable unrest in the Corps. As a result of this unrest a board of officers was convened at Fort Totten, New York, to consider matters pertaining to Coast Artillery firing and target practice. Major (now Brigadier General) R. E. Callan, C. A. C., who at that time was President of the Coast Artillery

Board, was a member of the board convened at Totten. The following recommendations were adopted:

(1) The Board is of the opinion that the present system of fire control described in Drill Regulations for Coast Artillery, 1914, as amended by Changes No. 1, and amended as recommended below, will insure efficient fire control instruction of Coast Artillery troops; that is, it is sound in principle and that it should be adhered to in principle until by actual test a better system is shown to exist. . . .

(2) The Board is of the opinion that the following paragraph, in substance, should be added to the Drill Regulations for Coast Artillery, 1914:

"Whenever during the fire of seacoast guns and mortars, instrument observation from shore stations or from air or water craft shows that the use of ballistic methods has failed to place the center of impact near the target, adjustment of fire based on such instrumental observations is authorized."

(3) The Board is further of the opinion that the following sentence, in substance, should be added to paragraph 8, Drill Regulations for Coast Artillery, 1914:

"When a target is first assigned, additional observations may be taken between bells, in order to reduce to a minimum the time necessary to furnish data to the emplacements for opening fire."

In making the foregoing recommendations the Board is actuated by the belief that by lessening the observing interval, a certain part of the time now lost in changing targets may be saved. There are, however, other elements at work to cause loss of time, which elements are believed to be common to both the 1909 system and the 1914 system. It will require an actual trial to determine how important a part of the total loss can be saved by the change proposed.

The Chief of Coast Artillery was prepared to accept these recommendations and they became a part of our regulations.

The World War came on before instrumental observation or spotting boards made their appearance, generally, in the Coast Artillery.

At the close of the World War the Coast Artillery found itself armed with railway, tractor, and antiaircraft guns, in addition to the fixed cannon of the coast defenses and the submarine mines. These are our weapons today and it is their development with which we have been concerned since the war and with which we are now concerned.

The extreme ranges used by the navies during the World War and the ranges at which their bests ships were conducting target practice after that war brought home to us the fact that some of our cities and utilities were not protected from gun fire. Additional provisions for long-range armament and fire-control equipment were required. Then, too, it was necessary to develop proper equipment and methods of training for the railway and tractor artillery in order that these weapons could be used against naval vessels. This development was imperative as there are many places along the coast and in our foreign possessions that are not fortified and their defense will depend upon our mobile guns. Further, the assignment of those practically new weapons, the antiaircraft guns and machine guns, to the Coast Artillery gave much need for development. Likewise, the need for a proper defense against poisonous gases could not be neglected.

The conditions were somewhat similar to those that faced the Coast Artillery in 1900 except that instead of getting an increase in personnel there was a decrease in the Coast Artillery Corps.

Major General F. W. Coe had been appointed Chief of Coast Artillery in 1918. He believed that the best results would be obtained if, for a period of time at least, he left the artilleryman free to follow his own devices in this development. The following is a quotation from *Instruction of Coast Artillery Troops, 1920.*

> KINDS OF PRACTICE.—Subject to the subcaliber and service ammunition allowance, each Coast Artillery district and brigade commander, with the approval of the next higher commander, will prescribe the number and character of the firing problems for each organization under his command and will issue the necessary regulations for the proper and safe conduct of the firing.
>
> It is expected that Coast Artillery district and brigade commanders will exercise fully their initiative in and responsibility for the methods of instruction and target practice.

Some of the results of firing in 1920 were unsatisfactory but the Chief made no change in his policy except to direct that a part of the ammunition be used in a specific manner for the adjustment of fire (for further information, see an article written by Colonel W. E. Cole, C. A. C., in the COAST ARTILLERY JOURNAL for August, 1924). In the United States the very limited number of troops that were available made it extremely difficult to carry out the proper seacoast practices. Nevertheless, a great interest was manifest throughout the Corps, especially in the solution of the long-range firing problem, spotting, and adjustment of fire. In this connection I invite attention to articles in the COAST ARTILLERY JOURNAL of February, March, and May, 1924, written by Brigadier Generals Hagood, Callan, and Hatch. Brigadier General Hatch (then Colonel) was at that time President of the Coast Artillery Board.

To meet the requirements for long-range firing new guns were constructed, some of which have already been mounted, and new mounts for some of the 12-inch guns permitting long-range fire were provided. The call for better fire-control equipment for long-range firing was insistent. To answer this call, in a measure at least, charts for the range-correction board and other devices were constructed in percentages, the scales of some of the plotting boards were greatly decreased, and larger and better boards were constructed. Upon the recommendation of the Coast Artillery Board a test was made of the Ford data computer in Panama. This test was under the immediate supervision of Major Quinn Gray, C. A. C., who had been a member of the Coast Artillery Board. Unhappily, this officer was taken ill and forced to retire before the test was completed. A further test was given the instrument during the past summer at Fort Story. With the improvements which could be included in a new instrument, the Board feels that the problem of artillery fire would be much simplified if such an instrument were provided for all our batteries. By the

follow-the-pointer system the gun can be kept laid at all times. Further, the chances for making errors would be greatly reduced as the instrument would permit of considerable reduction in the personnel handling instruments upon which the data depend. It would be a great achievement if all of our guns could be equipped with Ford data computers or similar instruments and the guns laid by the follow-the-pointer system, but the Treasury is not over-flowing now as it was in the 'eighties and 'nineties of the last century. I am afraid we shall have to be content if we can obtain these instruments for our most important batteries, and even their supply for this purpose will take some time and require some careful estimating.

The long ranges at which enemy ships can bombard our harbors and the speed with which these vessels may move, taken together with the difficulties to be met in the obtaining of expensive data computors, led many officers to seek a solution for long-range fire by improving our present equipment, adding comparatively inexpensive devices. The Coast Artillery Board has done considerable work along this line. It has constructed and tested mechanical range and azimuth predictors and mechanical extrapolators, which, used in connection with the manual plotting board, range-correction board, and Stephens deflection board, permit the determination and transmission of corrected firing data to two or more widely separated guns or directing points upon a 10 to 15-second basis. This equipment has been tested using a 15-second observing and predicting interval. These devices were used at Fort Story in connection with the firing of the howitzers at that fort. The results were satisfactory. It is expected that a limited number of these devices will be constructed in the near future for further test. The Coast Artillery Board project in reference to these devices will be published in the COAST ARTILLERY JOURNAL at an early date. Lieutenant Colonel C. M. Seaman, C. A. C., and Captain E. G. Cowen, C. A. C., are mainly responsible for the development of these devices.

Attention is invited to the fact that the Ford computer predicts for the time of flight of the projectile on a tangent, while the mechanical devices devised by the board predict on the secant. Neither of these instruments permit the plotter to use his judgment in making a prediction. The fact that the plotter cannot use his judgment may in some cases prove objectionable, and this is especially true due to the long time of flight of the projectile for long-range firing, but it is doubtful if the judgment of the plotter will in the long run prove better than the instrument. In some tests that the board had, even after the plotters had been shown the course prior to plotting, they did not come as near to the true position of the setforward point as was done by the use of the devices. This question is one to think about.

An improved universal deflection board has been constructed and tested. A limited number have been constructed for service test. This board, known as the Stephens deflection board, is described in the COAST ARTILLERY JOURNAL for April, 1928. The board was used at Fort Story with good results.

To meet the needs of the mobile Coast Artillery units, as well as to standardize fire-control equipment, the Cloke board was adopted as standard in 1923. Several large-sized boards with a movable azimuth circle and for use with various scales have been constructed. One of these large-sized boards was used with good results at Fort Story during the past summer. This board with a small scale and a long base line will enable extreme ranges to be determined, provided the terrestrial observers can see the target.

In some cases the observation stations are on low sites and vision is limited, so that at extreme ranges targets cannot be observed from these stations. In such cases this limits the fire of our long-range guns. Several attempts have been made to overcome this difficulty by the use of airplanes. The Coast Artillery Board, with the assistance of the Air Service, experimented considerably along this line. Similar experiments have been conducted at several harbor defenses. Though practices have been conducted using the airplane as the only range finder, as far as accuracy was concerned these practices were not very successful. Unless terrestrial observation can be had the Coast Artillery Board believes that with the present development firing at naval targets is impracticable. Fortunately many of our important harbors permit the construction of observation stations at such heights as will enable firing at extreme ranges using terrestrial observation.

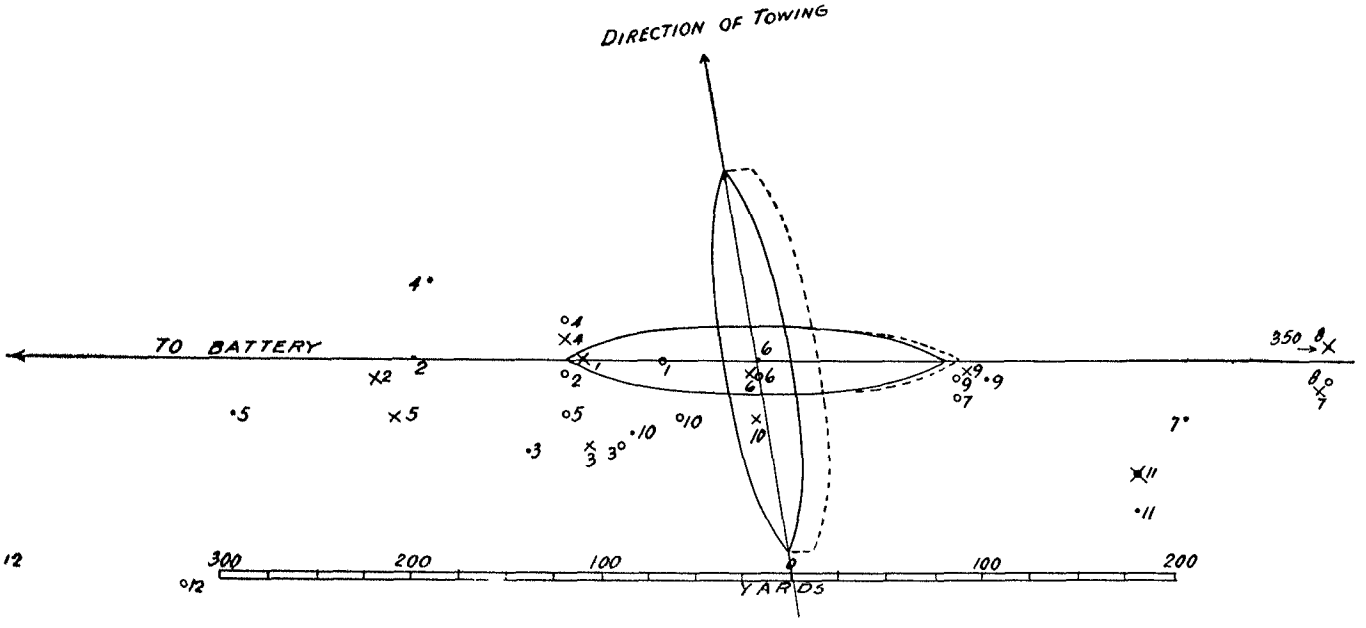
Referring again to the recommendations of the Fort Totten Board in regard to the necessity for instrumental observation of fire, it is to be noted that at the time this recommendation was made and until after the World War little attempt was made to provide equipment for locating the fall of the shots. Observation instruments were available but no satisfactory spotting board had been devised. Several boards were tested at Fort Monroe in 1923 but no standard board was adopted. Among the most promising boards used were the Gray, Hatch, and Cole; all of them had some objectionable features. The question of determining a proper spotting board is one that has been before the Coast Artillery since the war. The latest board, and one which gives considerable promise, is the Hincke Board as modified by the Coast Artillery Board. A model of this board has been made by the Coast Artillery Board and is now undergoing test. The Board feels that if the requirement that the fall of the shot must be referred to the setforward point stands a plotting board will be required for spotting; if, on the other hand, the fall of the shot may be referred to the target several of our spotting boards give good results. The question is still an open one. In this connection I wish to invite attention to the difficulties of spotting, using the small pyramidal target, to what those difficulties would be if a naval vessel were the target, and provided only the sense of the shot were required. In 1927, through the courtesy of the Naval authorities at Pearl Harbor, a naval target was secured for one practice with the 155-mm. guns at Fort Kamehameha. This target is over forty feet high and over one hundred feet in length. The range at which the target was towed when fired at was

between 7000 and 8000 yards. The rate of fire was one shot per gun every fifteen seconds. An observer near, but above, the guns equipped with a pair of good field glasses had no difficulty in calling shorts and overs. This he could not do when the pryamidal target is used. Such a method of spotting gave only the "sense" of the shot and would not be satisfactory when firing major-caliber guns at long ranges. I am confident, however, that for short ranges with rapid-fire guns such a method of spotting would give good results. The spotting problem as a whole is still under study.

With the location of the fall of the shots known, the question of adjustment of fire becomes important. It is easy to say that the center of impact should be placed on the target and kept there, but to carry this requirement into effect is not so easy. Several memoranda and training regulations were published on this subject, and it was, and is, stressed in the Coast Artillery School and in some of the schools at posts. Some devices have been constructed to assist in adjusting fire, among them the impact board and the fire-adjustment board. The Coast Artillery Board recommended the adoption of the fire-adjustment board as standard. A new *Gunnery* which covers adjustment of fire in considerable detail is in course of publication. The Coast Artillery Board co-operated with the School in its preparation.

It is not to be expected that every splash will be observed or that spotting can be depended upon in all cases. Preparation of fire is a prime necessity. Insofar as possible, correct ballistic data must be determined. A correct determination of the muzzle velocity would be a big step in advance. While the correct muzzle velocity can be determined with little difficulty at the Aberdeen Proving Ground, and with considerable trouble to a fair degree of accuracy at other places, a suitable field chronograph has not yet been found. However, this year a field chronograph called the Jeka Duma was purchased abroad. This instrument has given great promise and may solve the question of obtaining velocities in the field. Much progress has been made in the determination of the ballistic wind and atmosphere corrections, but as yet our knowledge is far from accurate. Until such knowledge is more dependable, deliberate trial fire must be used except for comparatively short ranges.

With adjustment of fire stressed, and batteries firing salvos, the necessity for calibrated guns becomes more pressing. It is manifestly impossible to adjust on the center of impact of a group of shots and get good results unless the guns of the firing battery are calibrated. Calibration of batteries will require the expenditure of considerable ammunition, at least four to six shots per gun, but the Board is of the opinion that this expenditure will be justified. Until a regular calibration fire is possible the past performance of the guns should be studied and advantage taken of the knowledge gained thereby to effect calibration corrections insofar as possible, but these means will not prove entirely satisfactory.



● Actual Point of Impact
o Reported by Airplane
x Reported by Spotting Board

FIG. 1

Range 25,700 yards

Mortar fire has not been satisfactory. The correct data for one zone will not furnish information on which to adjust when firing passes to another zone. This is especially true when changing from one projectile—the 1046-lb. to the other one—the 700-lb. The Board did considerable work with a view to improving accuracy of zone-to-zone firing. A range correction chart was provided. A test was held in the Harbor Defenses of Los Angeles in 1927 in accordance with a program prepared by the Board but the results were not satisfactory. Correct ballistic data for the high altitudes for the outer zones are difficult to obtain. It seems as if the problem of firing in each zone must be considered separately and trial shots fired in each of the zones. The board has recommended that this be done until some better method is found.

The Chief of Coast Artillery causes the reports of all target practices to be forwarded to Aberdeen Proving Ground for the study of ordnance experts where special attention is being given to the problem of zone-to-zone fire, and it may be that some solution will be found. The problem itself has been with the Coast Artillery for a long period of time. It is of such a nature that correct adjustments in passing from zone to zone are hardly to be expected. However, the number of shots that may be fired from mortars with the possibility of adjustment on one salvo makes the mortar a very useful weapon and one to be retained.

The use of poisonous gases in war has caused the Coast Artillery to seek some method of protection in case of a bombardment of a battery with gas shells. The Chemical Warfare Service has been consulted in this matter and gas masks have been improved for the use of observers and telephone men. In a few cases actual target practices have been conducted with the men under gas and all of them equipped with gas masks. While some of these practices have been fairly satisfactory, a better solution was sought. Gas protection for the plotting room at *Battery DeRussy* was installed and a test made. The solution as made is believed to be satisfactory and one that can be installed in all batteries. The doors and windows are securely boarded up and pure air forced into the plotting room.

I have mentioned quite a number of necessary developments, some of which have been perfected and some of which are still undergoing study, but I do not wish to be understood as feeling that with present-day armament and equipment the Coast Artillery could not give a good account of itself in any engagement against naval vessels. My opinion is quite the contrary. In the first place, battleships are no match for coast fortifications, and to silence these fortifications either a landing force or fire at extremely short range would be necessary. This has been the teaching of history, and was further evidenced by the Dardanelles campaign.

We have had some very good practices with our present equipment at both long and medium ranges. I invite attention to Fig. 1, showing a diagram of a long-range practice of *Battery Closson.*

This practice was held at Fort Kamehameha, T. H., November 18, 1926, Captain Frederick Loftquist, C. A. C., commanding. *Battery Closson* consists of two 12-inch guns mounted on barbette carriages for long-range firing. Only one gun was fired in the practice. The average range was 25,744 yards. Three trial shots were fired which fell approximately 1000 yards beyond the fixed point at which they were aimed. The target was towed by the tug *Cuba* at a speed of approximately 8 to 10 knots. The target was larger than the average pyramidal target and could be seen from three observing stations, all of which were several hundred feet in elevation. Only the smoke stack of the tug could be seen from the battery. The plotting board used was a Cloke board, scale 1500 yards to the inch. The base line was approximately 9000 yards in length. The spotting stations were near the ends of the base line. A modified Gray spotting board was used. Airplane observation was had and reports from the airplane, as well as from the terrestrial observers, were very prompt. Corrections were made as a result of the airplane spotting. An examination of the record of the fall of the shots indicates that two hits were obtained on the bow-on target and one hit on the broadside target. At that time the broadside target was the only one used. As a matter of fact one shot actually struck the small pyramidal target. An examination of the figure indicating the fall of the shots shows that excellent results were obtained. It is to be expected that such results may be obtained where excellent observation is practicable, as is the case in Oahu. The rate of fire was one shot about every 76 seconds. No attempt was made for speed as the carriage was not suited to rapid firing using Case III as it is very difficult to hear the azimuth setter who is in the well of the gun and, further, the range was so great that deliberate fire was desirable.

A study of Coast Artillery Memorandum No. 8, dated August 23, 1927—Coast Artillery Target Practice, 1926—shows quite a number of excellent practices and in some cases the rate of fire was very good. In this connection I invite attention to the night practice at Fort Kamehameha, Captain A. C. Cleveland, commanding, 12-inch disappearing carriage. The rate of fire was 37.7 seconds per shot per gun in which hits per gun per minute was .531. Also, the practice at Fort Mills, P. I., Captain A. C. Cheseldon, commanding, 12-inch barbette carriage, in which the rate of fire was 42.9 and hits per gun per minute .525. Of the small-caliber guns I invite attention to the practice of Battery Jackson at Fort Kamehameha, T. H., 6-inch guns, Captain F. F. Gallagher, commanding. Night practice: rate of fire 18.6 and hits per gun per minute 1.231. Day practice: rate of fire 14.5, hits per gun per minute 1.751. With 3-inch guns at Battery James, Manila, P. I., Captain H. G. Archibald, commanding: time to fire one round 9.6″; hits per gun per minute 5.058.

One will find, too, some very excellent practices with the 155-mm. gun. These guns can deliver fire every 15 seconds without difficulty, but they are still handicapped by the limited field of fire—60 degrees. In Panama where

the gun is semi-fixed a platform has been built enabling fire to be conducted through an arc of 180°. The question of the development of a proper mount for these guns for seacoast firing is still an open one.

I mention these practices to show what was being done in some places throughout the service in the long, medium, and short ranges, both night and day in 1926. But it was felt that there were too many practices where the rate of fire was too slow. General Hero, who became Chief of Coast Artillery in 1926, instituted the graphical analysis of target practices and adopted a figure of merit for the rating of batteries to take effect in 1927. A careful study of the records convinced him that while many of the practices were good there were quite a number in which the firing was slow and the shooting not up to the required standard. He felt that it would be better for the Coast Artillery as a whole if a figure of merit was again adopted, at least for battery record practice. As at the previous time when a figure of merit was in operation many officers were in favor of it and some were opposed to it. Those in favor of it felt that it stimulated interest in target practices. Those opposed to it felt that while it stimulated interest in target practice it did so at the expense of battle conditions. They contend that an acceptance of the figure of merit as the standard of efficiency was not correct and that officers instead of looking to development for battle would seek to get a high score. Unquestionably, there is something to be said on both sides. Those officers who contend that a high score would be the object as opposed to development were undoubtedly correct. On the other hand those who favored the figure of merit were correct in the assumption that more interest would be taken in the practices if one were adopted.

A study of 1927 practices caused the Chief of Coast Artillery to feel that the rate of fire was not properly appreciated; that there was too much time spent in the adjustment phase of the practice. Accordingly the figure of merit for the year 1928 was so written that the value of time was squared and given great prominence. While this has led to a satisfactory rate of fire as a whole, it has in some cases led to a speed mania. Practices have been conducted when the shots were falling far from the target but on account of the short length of time required for the practice no corrections could be applied. There were instances where if a target had been a hostile vessel it is doubtful if those on board would have known they were under fire. Yet a good score resulted. Curiously enough, too, often a large DAPE resulted in a good score even though the hits were few, and a small DAPE with a greater number of hits would give a less score. Such a condition was manifestly wrong. These conditions led to a revamping of the figure of merit, and during the past few months the Coast Artillery Board and the Coast Artillery School have revised the score and submitted it to the Chief of Coast Artillery. It has, in the main, been adopted. It is the expectation of the board that this score will more nearly equalize the comparative value of hits, time, and accuracy. It cannot be expected, however,

that any figure of merit where only a few shots are fired as must be the case with our limited amount of ammunition, can give a correct measure of the efficiency of a battery. It is believed that with the new figure of merit that good practices will get good scores and poor practices will get poor ones. It is not to be expected that the best battery will always get the best score. The question of chance is bound to enter, but the captain who has a well-trained battery will have the dice loaded in his favor. At the present time it should be noted that there is no rating of batteries for the preliminary practice and none for battle practice; the former gives the battery commander leeway in preparation for record fire, the latter requires the fort and group commanders to exercise their normal functions and permits, insofar as practicable, an assumption of battle conditions. Battle practice should result in the development of a system of concentrating fire on a single target or dispersing the fire as the tactical situation may warrant at the same time requiring, insofar as possible, the adjustment of the fire of each battery separately. This will require careful timing of salvos or the use of colored splashes.

In connection with the matter of rating batteries, it is interesting to note that from the development from 1900 to 1907, a period of seven years, there was no figure of merit. Similarly, the development from 1920 to 1927, there was no figure of merit. But when the development had proceeded for a certain time there was a call for a figure of merit in both instances.

The development of antiaircraft artillery presented a difficult and pressing problem for solution. During the World War guns, mounts, and fire-control equipment were hastily provided; the 75-mm. gun was the principal weapon. A new 3-inch gun was designed but before it was available the armistice was signed. This gun was finally completed and some placed in the hands of troops. A newer model, 1928 MI, embracing many improvements has been constructed and is now undergoing test at Aberdeen. This gun is admirably designed, has a high muzzle velocity, and is very mobile. It is a most satisfactory weapon, capable of firing 25 rounds per minute. Another gun, the 105-mm., is now being tested at Aberdeen Proving Ground. This gun is on a fixed mount, shoots a projectile weighing 33 pounds, and can be fired at the rate of 15 shots per gun per second.

Two data computers or directors, the Vickers and the Wilson-Sperry, are undergoing test at Aberdeen Proving Ground. Both of these instruments are great improvements over the RA corrector now in the service, but which will ultimately prove to be the better is yet to be determined. The Vickers makes no corrections except for wind; other corrections can be put in as spotting corrections. The Wilson-Sperry instrument will calculate all ballistic corrections and apply them to data sent to the guns.

To determine the altitude, an element of data which must be put into a computer, a height finder of some kind must be used. Several coincidence and

stereoscopic instruments are being tested at Aberdeen Proving Ground with the expectation that one of them will be selected. One of the advantages of the new system is that the men following the target are close together, making it much easier to put observers on the same target. Dead time has been eliminated, data being transmitted electrically to the guns and the results indicated by pointers and dials. The traversing and elevating details watch the pointers and can keep the data continually set. The same is done on the fuze setter, the setting of which is automatic and continuous. The data computer needs to predict for time of flight only. Another development is the torque amplifier which permits the guns to be laid by the data computer without the aid of traversing and elevating details at the guns.

Searchlights and sound locators have been the subject of much experimental work, with the result that now both have been much improved. The old 36-inch light and Mack truck have now given way to the 60-inch barrel light and Cadillac power unit.

There are two types of new lights, one of 150 amperes, the other of 250 amperes. The main difference in the two is the increased average of illumination given by the 250- ampere light.

The type of sound locator now used is still the exponential horn, but corrections for sound lag and other conditions may now be applied automatically as is the case in gun fire. Furthermore, the data from the horns are received at an instrument known as a comparator. Here the operator matches his pointer with the one actuated by the horn and so moves the light. This permits of distant operation of the searchlight, thus keeping the operator from being blinded by his own beam. Sound locators are to be carried in specially designed vehicles so that the whole unit, lights and locators, would be able to make from 30 to 35 miles an hour on good roads.

Automatic guns have come in for much development since the war. The .30-caliber machine gun has been improved. However, the principal effort along the small calibers has been put into the development of the .50-caliber gun. This piece was used in the World War as an anti-tank gun and when used for antiaircraft work gave great trouble. There was no suitable tripod, no good cooling system; the gun itself functioned very badly under sustained fire and there were no suitable sights on hand. This piece has now been put into excellent condition. It will deliver 500 rounds per minute. Its accessories, such as tripod, cooling system, flash hider, and others, are all now in satisfactory condition. For long-range work data computers have been provided so that the whole platoon of four guns can function as a gun battery or as four free guns. This whole installation has been built from the ground up since the World War.

Experiments have been conducted so that four guns can be mounted and fired from the same mount. This system is called the multiple mount and gives

great promise for the future though at present no such mounting is in final form.

Along the development of lighter calibers was the building of a battery of 37-mm. guns. These are full automatic guns designed for a muzzle velocity of 3000 f. s., and firing a 1¼-pound shell at the rate of 100 rounds per minute. This is a mobile piece that can be emplaced in 3½ minutes and can be pulled over almost any sort of ground. It is controlled by a data computer as is a gun battery. This weapon is supplementary to the 3-inch gun and the .50-caliber machine gun.

With the new towing vehicles in operation, such as the Coleman truck and others, it is possible to take any of the mobile pieces I have referred to over very rough ground, units are not restricted to roads.

Major J. D. McCain, C. A. C., a member of the Coast Artillery Board has been in general charge of the antiaircraft development at Aberdeen Proving Ground this year. A battalion of the 62nd Coast Artillery has been temporarily at that station. Major McCain is very enthusiastic over what is being done and feels that the results more than justify the time and labor spent. This development will continue for some time to come.

With reference to antiaircraft artillery target practice, it has been but a few years since firing at a moving target was considered possible. Since that time a great deal of advance has taken place. It is realized that the scores cannot be called a true measure of the accuracy of the firing largely on account of the difficulty of spotting and earmarking the shots. At the Coast Artillery Board we have upon the wall scores of various antiaircraft batteries. It is interesting to hear the remarks of the various officers in looking over these scores. Such comments as "not true," "that can't be done," and "I don't believe it," are often heard. The development of a camera to facilitate spotting is in progress due largely to the efforts of Captain A. M. Jackson, C. A. C. Results of the Aberdeen tests indicate that the score computed when the camera is used approximates one-half the score when spotting is done by ordinary methods. Undoubtedly the use of the camera would have reduced several high scores that have been figured in the past. It is expected that this camera will ultimately become an article of standard issue since the results obtained with it are beyond a doubt correct.

With reference to the Coast Artillery Corps as a whole I feel that it has made as much real development during the past eight years as it has made in any like period of time in its history, and it has done this in spite of the very limited personnel which has been assigned to it. When the records of the past and present are examined and hazy memories thrown in the discard, no fear of comparison with the past need be felt by officers of the present day.

In conclusion I wish to add that the Coast Artillery Board is anxious to receive suggestions from the Coast Artillery officers throughout the service. In that way only can we keep abreast of the times.

APPENDIX A

BATTERY PARROTT, FORT MONROE, VIRGINIA

Date	Organization	Battery Commander	TS	RS	Hits	Mean Range (RS)	Elapsed Time m s	Time Out m s	Corrected Time m s	Remarks
5-14-07 x	35 Co.	C. E. Kilbourne	3	6	1	6875	5 07⅘	1 59	3 08⅘	Test and exhibition for General Kuroki. Order: 5, 3, 5, 3, 5, 3.
7-10-07 x	35 Co.	C. E. Kilbourne	3	6	2	7361	7 13	3 55	3 18	Only 1 shot fr No. 3 piece. T Speed 6.8 m. h. Order: 5, 5, 3, 5, 5, 5.
11-16-07 x	35 Co.	C. E. Kilbourne	6	4	4	6041	1 33	0 24	1 09	6 shots calibration, 4 record shots. T Speed 5.5 m. h. Order 5, 3, 5, 3.
7-13-08	166 Co.	R. M. Mitchell	3	6	2	5407.5	12 45	6 54	5 46½	Excess time eposure 5½ sec. Student officers' practice. T Speed 6.1 m. h.
10-21-08	166 Co.	R. H. Williams	4							Stationary target. Proof firing No. 3.
10-30-08 x	166 Co.	R. H. Williams	3	6	0	6833	6 25	1 52	4 33	Trouble with ramming. T. S. 16.2 m. h.
11-3-08	166 Co.	R. H. Williams	3	4	0	6705	10 19	7 07	3 11	Same trouble. T Speed 6.8 m. h.
7-2-09	166 Co.	R. H. Williams	3	6	3	4381		15 20	4 18⅘	T Speed 4.43 m. h.
7-20-09	166 Co.	John M. Dunn	3	6	4	4600		00	6 03	Student Officers'. T Speed 5.1 m. h.

X DISPERSIONS—target practices of 5-14-07, 7-10-07, 11-16-07, and 10-30-08.

5-14-07

+133	18 L
— 37	3 L (Hit)
—700	8 L
—189	17 L
+ 95	12 L
—217	11 L

C. I. — 154 1-3

7-10-07

0	16 L (Hit)
—132	0
0	0 (Hit)
—147	6.5 R
—400	0
—173	0

C. I. — 142

11-16-07

4 Record Shots. All hits

10-30-08

—108	All good for direction
—300	
—300	
—168	
—324	
—324	

C. I.—259

Message Center Operation for Rapid-Fire Mobile Artillery

By Staff Sergt. Paul C. Doster, 55th C. A.

Foreword

ONE of the most important factors in reducing the time between orders for fire and the actual firing is the transmission of messages through the message center. A period of time ranging from thirty seconds to three minutes may be lost in the message center in recording and transmitting messages concerning fire. On the other hand, with the message center properly operated, messages may be transmitted, record made, and the firing started with no delay whatever in the message center.

It has been the experience of the writer through several years of duty as chief of message center for mobile artillery regiments that the present system of message center operation, as outlined in the message center manual issued by the War Department, is not sufficiently flexible to permit operation under high pressure, with messages being transmitted at the rate of from sixty to ninety an hour. It is not, therefore, suitable for use by mobile artillery where saving of time is essential and where seconds actually count for as much as minutes.

There are two prime requisites for an efficient message center under the present operation system: (1) Correct transmission of message; (2) An accurate and complete record of each message, showing time of receipt and time of dispatch.

There cannot be too much importance placed upon the speed of transmission of messages through the message center. By slow operation it is not only possible to delay the fire of an entire regiment of rapid fire guns of great effectiveness, but it is probable that such will be the case. An example of this slowing up follows:

A battalion of 155-mm. guns, consisting of three batteries of four guns each, is in position along the shore with an interval of one mile between batteries. The directrix of the batteries being approximately the same, the field of fire for the entire battalion will be approximately 15,000 yards, or eight miles wide, at a range of ten thousand yards to twelve thousand yards. A squadron of light cruisers, traveling left to right at a speed of 30 knots, or approximately 34 miles an hour, enters the field of fire at a range of 12,000 yards from the first battery and proceeds full speed ahead straight across the field of fire laying a smoke screen or firing on the shore batteries. The targets will, therefore, remain in the field of fire for a period of approximately fourteen minutes. Assuming that one battery will fire at a time, there will be time for approximately 216 rounds on the basis of each battery firing at fifteen-second intervals for four and one-half minutes. This is taking for granted that the batteries

are ready to fire the moment the targets enter the field of fire and assuming that orders have been transmitted through the message center with no delay. However, if there is a delay of six minutes in the message center, which is a small margin of delay under the present system of message center operation, the battalion can only fire 120 rounds, which lessens by almost half the effective-

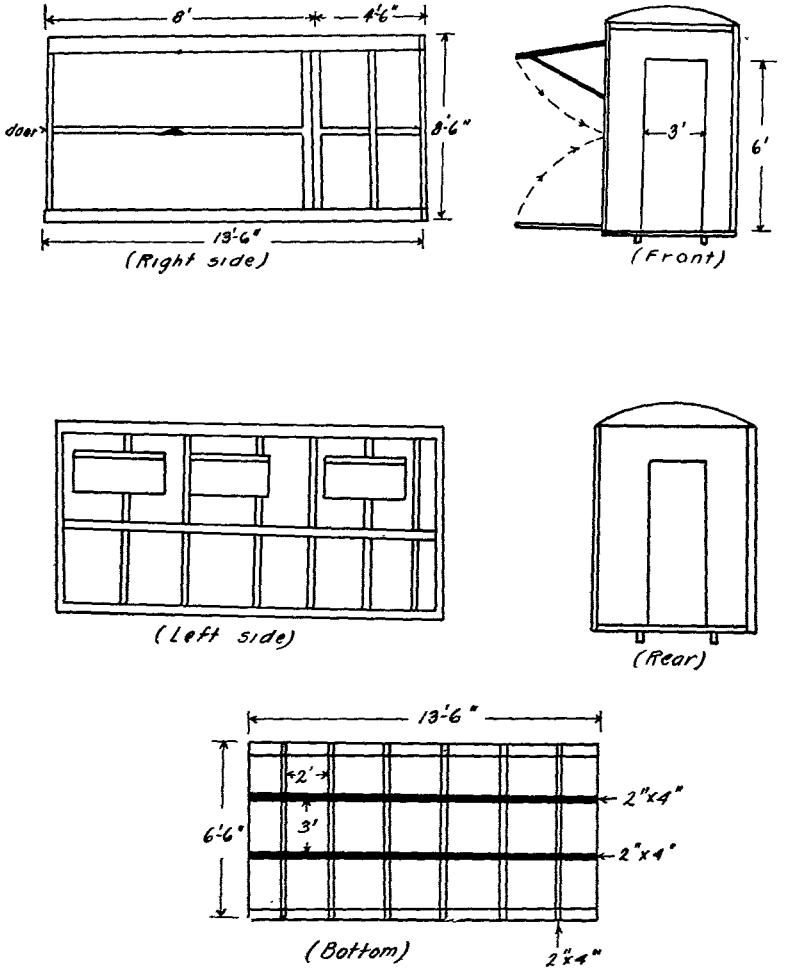


FIG. I. MESSAGE CENTER TRAILER (Outside)

ness of the battalion. Thus it can be seen that delay in message and order transmission has cost the battalion 96 rounds, and since it is a surety that a cruiser being fired upon by a shore battery at full speed and with its greatest effectiveness cannot accurately return this fire, the delay in message transmission might permit the cruisers to fire upon our batteries without interruption for a period of six minutes, which is a long time in rapid-fire organizations and might occasion the useless sacrifice of many lives.

The writer has, after much experiment with various methods of message center operation, succeeded in cutting down time for transmission to an almost negligible number of seconds. An example of the flexibility of this system of operation and its advantage over the old system is apparent below. The messages marked *n* were messages transmitted under this system by somewhat inexperienced personnel. The messages marked *o* were the system now in use as outlined by War Department *Manual on Message Center Operation* (these messages were under simulated war).

(*n*) 5:32 AM Destroyer squadron reported by Battery B.
(*n*) 5:33 AM Group commander had been notified by phone and message center chief ordered to notify higher headquarters and request orders to fire.
(*n*) 5:33.5 AM Higher headquarters notified, orders requested.
(*o*) 5:39 AM Message from higher headquarters with orders to open fire.
(*n*) 5:39.5 AM Group commander had orders and ordered B Battery to open fire.
(*n*) 5:40 AM Battery B reported that it had opened fire.

By analyzing the above it will be seen that the entire function of the message center operated under this system required three minutes, while the transmission of one message alone under the War Department system required over three minutes, assuming that the higher authority consumed one and one-half minutes in giving the verbal order to open fire. This delay of three minutes enabled the destroyers to travel over a mile unmolested and sacrificed approximately 48 rounds which might have been fired at them by Battery B.

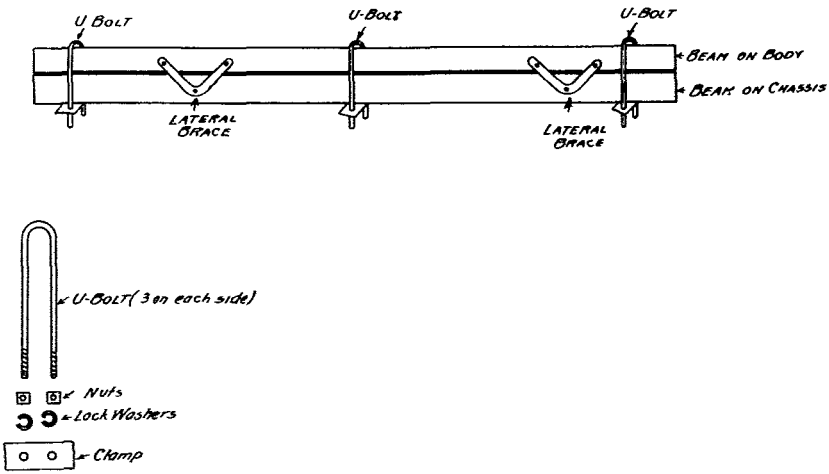


FIG. 2. METHOD OF ATTACHING BODY TO CHASSIS

THE MOBILE MESSAGE CENTER TRAILER

1. *Use.* The mobile message center is primarily for a mobile regiment of artillery, although it may be adapted to the requirements of any group or groupment requiring a message center which must be moved from place to

place. As the fixtures within this message center are permanent and the switchboard is a permanent installation, the time of connecting up and disconnecting is limited only by the speed with which the wire men lay wires to the different communication points and attach to the permanent terminals at the message center. Thus it can be moved from place to place as required with very little loss of time and with comparative ease. Its usefulness as a time saver is obvious, as within ten minutes after arrival at the end of the wires the message center can be connected and in operation.

2. *Construction.* The principal parts of the message center trailer are—

a. The trailer chassis. This is a four-wheeled chassis with towing tongue for connection to either a truck or a tractor. The wheel base is 135 inches and the width of the chassis is the same as the standard trailer. (The chassis now used for chart-room trailers is ideal for this purpose.)

b. The body (see Fig. 1). The body of the message center trailer with which these experiments were conducted was adapted from the body of a chart-room trailer issued for use by the air service and found on the post. The details of alterations to this body may be seen by studying the drawing of the completed trailer (Fig. 1). All dimensions are given on the drawing. The body is clamped to the chassis by use of U-bolts, three to each side, and the use of angle-iron braces to give rigidity and prevent slippage. The method of attaching body to chassis is shown in Fig. 2 herewith. Any suitable metal available may be used for these U-bolts providing it has a tensile strength of at least one ton. The angle-iron braces are placed so as to prevent lateral play and assume rigidity of the trailer body.

The interior of the trailer body is constructed as shown in Fig. 3 herewith. The fittings required are:

1 Built-in table, 8′ x 30″.
1 Field switchboard installation.
1 Stand for field desk.
4 Mess stools (permanently secured to floor).
15′ Lighting installation.
2 Field telephone units permanently attached to table.
2 Attachments for fixing typewriters to table.

The equipment for the trailer is:

1 Complete field switchboard units (constructed as shown in Fig. 4 herewith).
2 Field telephones (1 with headset and 1 with handset).
2 Typewriters.
2 Lamps, Coleman or electric.
1 Field desk, regimental, containing supplies for clerical work and message center blank forms.

3. *Method of Transporting.* After experiments conducted to determine the best method of transportation of the message center trailer, it was decided that having it towed by a 5-ton tractor was the most suitable method under conditions existing at experimental station. It was found that towing this trailer behind a truck or other vehicle which moves at a rate of speed of ten miles per hour or over was impracticable due to the fact that the trailer would not

follow the truck without whipping from side to side on the road and thus endangering passing vehicles. However, at any rate of speed less than ten miles per hour, the trailer can be maneuvered without difficulty and on the road is very easy to handle. This method of transportation is considered superior to towing by truck as the tractor can tow the trailer to places not accessible by truck and can therefore render it easier to camouflage and enable placing it in more advantageous positions. The loss in speed in moving from place to place is negligible, as the 5-ton tractor has a road speed in excess of

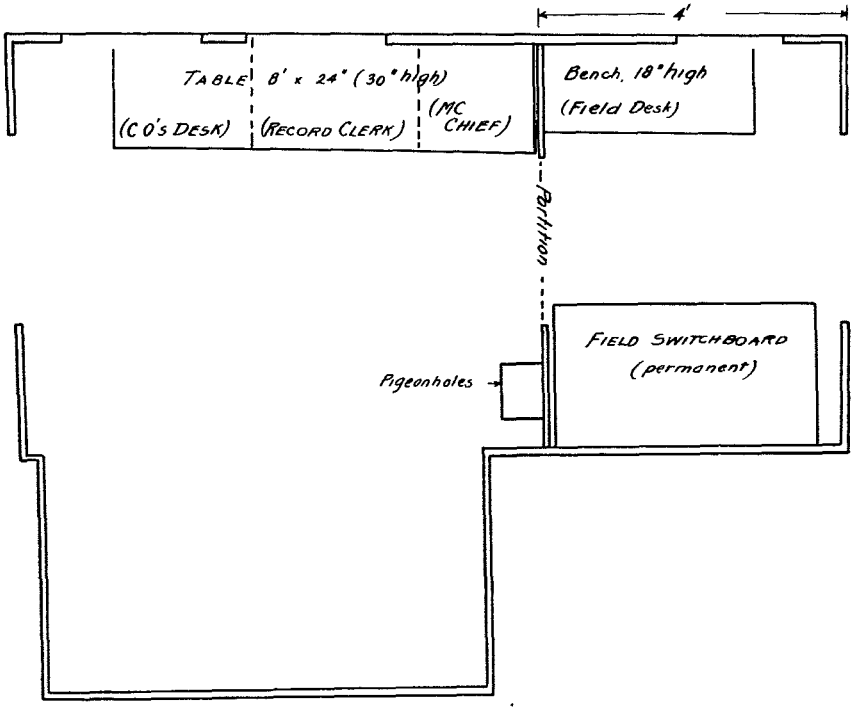


FIG. 3. FLOOR PLAN AND ARRANGEMENT (Interior)

those required to move the guns of the regiment conducting the experiment and the trailer can be sent ahead of the heavy columns of the regiment and be in position for connecting up by the time the batteries get to their positions. The speed and apatability of the 5-ton tractor is such as to make it an ideal vehicle for towing this trailer. The experiments were conducted over macadamized roads and cross-country roads that included almost every condition to be expected in field maneuvers. It was therefore decided to use the tractor for this purpose.

PERSONNEL

1. *Personnel Requirements.* In reducing the number of men required for the efficient operation of the mobile message center this type of message transmission not only releases for other duties men who must under the present

system stay in the message center, but it materially reduces the probability of errors. There are only four men required for efficient operation of the entire message group. Three of these men are on duty in the message center proper and the fourth is a radio operator and visual signalman. The fact must be borne in mind that the three men who operate the message center, and alternates for them, must be men of unexcitable temperaments. The ability of each man in the message center to remain calm under the highest pressure often makes for success or failure of the message center. It has been the experience of the writer during the past two years of experimenting that a young soldier which is a graduate of high school is a better man for the message center than the so-called "old soldier" with a sketchy grammar school education. There are several general requirements for every member of the message center detail:

(a) Ability to make quick decisions.
(b) Clear enunciation and of sufficient education to assure good composition and the use of brief and precise speech over the telephone.
(c) Ability to speak slowly and clearly without changing the tone of voice.
(d) Ability to talk over a telephone.

In the message center proper the following personnel is required, and their general qualifications for the work should be as listed below:

a. Message Center Chief. It has been found that a sergeant major who is a stenographer and who has had some experience in administration is better fitted for this detail than the ordinary typist. At any rate he should be a noncommissioned officer of the grade of sergeant or higher.

(1) Typist with speed of sixty words a minute or more.
(2) Noncommissioned officer of sufficient authority to exercise supervision over communications if necessary.
(3) An excellent education. (High school graduate or better.)

b. Records Clerk. Under this system the records clerk is also the code clerk, and during times of emergency should be able to send and receive visual signals. He should be a man who is painstaking in detail work and who can be depended upon to overlook nothing in the making of records.

(1) Typist with fair speed.
(2) Familiarity with all message center forms and their uses.
(3) Good education.
(4) Familiarity with codes in use in message center and ability to encode and decode rapidly.
(5) A working knowledge of sending and receiving of visual signals.

c. Switchboard Operator. This man should be a man of sufficient experience with the service type of field switchboard to assure that he will not make mistakes in connections. He is also available in emergency as a visual signalman.

(1) Thorough knowledge of the operation and care of his switchboard.
(2) Ability to make minor repairs to telephone equipment and lines.
(3) Working knowledge of sending and receiving of visual signals.

There is a fourth man who is normally considered a part of the message center. He is the radio operator, and due to the fact that most mobile units have their own radio truck, his station will no doubt be away from the message center. Upon this man depends to a great extent the maintainence of communications in case the land lines fail. He should, therefore, be primarily a radio operator and visual signalman. In case radio and land lines fail, he, with the records clerk and switchboard operator from the message center proper, may keep up communications by means of the various forms of visual signalling. As a general rule, the radio operator with Coast Artillery regiments is a specially trained man who is qualified to perform these duties.

2. *Training.* The training of all units is primarily for bringing them to such proficiency that they can either function efficiently in action or can instruct others properly. The training of the personnel for the message center unit may be carried on in conjunction with drills which are regularly scheduled. With the mobile message center trailer, it is an easy matter for the message center to be hooked up with the firing batteries and the various communication terminals and function at routine drills in the same manner as it would function in the field. For drill purposes the three members of the message center detail may be relieved by their alternates from time to time to assure all members of the detail a proper working knowledge of their duties and the ability to perform them rapidly and efficiently. A drill set-up which is being used at the present time by one regiment of mobile artillery has been found very satisfactory for this training in that it both trains the message center detail and furnishes the group commander with a record of action during the drill. A diagram showing this set-up follows:

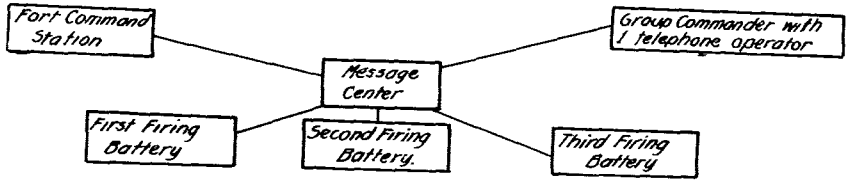


FIG. 4

In this case the message center has been parked at a point about a hundred yards from the firing batteries and all drill is carried on under field conditions. It is obvious that the training of the message center should receive just as much consideration as the training of the other units of a command as upon the message center depends a great deal of the work of coordinating these units. A firing battery in most cases must communicate with higher headquarters through the message center, and the message center detail must be competent to send messages through promptly and accurately.

The selection of men for this detail has great bearing upon the training. Unless the best personnel available is used it is useless to endeavor to secure proper operation of the message center. This is true both in using the old

system and the present one. As a rule the writer has observed that commanding officers responsible for training personnel for message center operation are prone to place upon that detail men who are not suitable for other work. In other words, if a man is a good telephone repairman the battery commander will ordinarily place him upon repair work rather than train a man for that duty, and place some man who can easily be trained as a repair man on message center duty when he may be unsuitable for that work.

3. *Duties.* In a brief way, the following outline gives the duties of the various members of the message center detail:

a. Message Center Chief:

(1) To receive, transmit, and record on a rough log sheet all messages coming through the message center.

(2) To classify these messages as they come in and decide upon the order in which they will be dispatched.

(3) To decide whether or not messages will form a part of the permanent message center record.

(4) To supervise the operation of the message center and make sure that proper records are being kept.

(5) In times of speedy transmission, to exercise constant control over all messages and route them through in proper sequence according to importance.

b. Records Clerk:

(1) To assist the message center chief in the receipt and transmission of messages.

(2) To make proper form messages from rough log and include in permanent records.

(3) To be in charge of the records of the message center at all times and to keep those records up to date.

(4) To encode and decode messages rapidly and accurately as required.

(5) To have a working knowledge of visual signalling and in time of emergency be able to send and receive by means of visual signals.

c. Switchboard Operator:

(1) To give prompt and accurate connections when called for.

(2) To repair all minor breaks in his switchboards and telephone in the message center.

(3) To be able to connect quickly all telephones on his board so that all telephones are direct connected and the conversations may be overheard by the message center chief.

General Operation

1. *Routine of Operation.* All military messages are divided into three classes. They are—

a. RXmessages. These messages are classified as *RUSH* and take precedence over any other message on the line except other rush messages. If lines are being used for the transmission of other messages and a rush message is

announced, the lines will be cleared immediately. When two or more rush messages are coming through simultaneously they must be handled in order of importance, except in the case of firing orders or assignments of targets which take precedence over all messages.

b. P messages. This classification is "Priority," and includes all messages reporting on action, observers' reports, and other messages not of a routine nature but not of sufficient importance to be classified as rush.

c. OD messages. Ordinary messages concerning routine administration and supply are classed as OD. They will not be sent over the lines while the lines are being used for other work, but will be sent during odd times.

In addition to the three classes above, there are "Personal" messages, that is, messages from person to person concerning affairs other than the action at hand. They will not be routed over the wires if required for anything else.

DIAGRAM OF MESSAGE CENTER NET

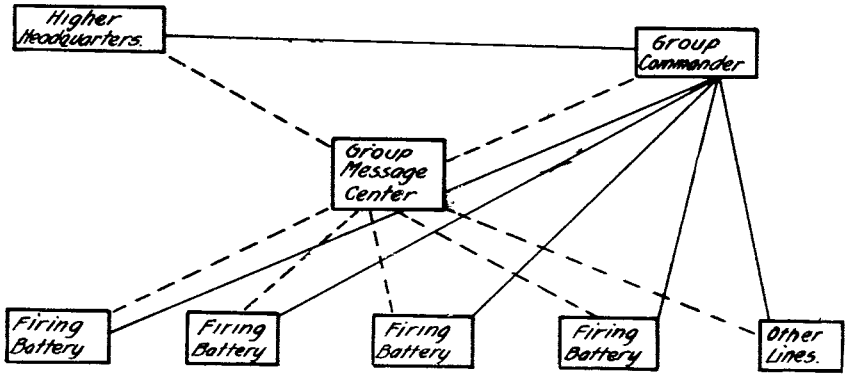


FIG. 5

In the matter of priority of messages it must be borne in mind that all command lines have priority over other lines and messages coming over these lines have priority over messages over any other lines. These command lines are:

a. Higher commands to your command.

b. From your headquarters to your organizations and units.

c. Staff departments to message center.

d. Battery lines to message center.

e. Lines between subordinate commanders and their stations, such as the line from a battery command station to his observation post. These lines do not ordinarily pass through the message center.

The command net, insofar as the message center is concerned, is illustrated in Fig. 5 and these lines have priority over every other line. Solid lines as shown are command lines. Broken lines are lines over which is possible for persons to hold direct conversation through the message center chief's telephone. By a glance at this diagram one may readily see that the direct transmission of messages from senders to receivers, with the message center chief making a record of the message as it goes through, is easy of accomplishment:

A message comes into the message center. The switchboard operator immediately puts the call upon the phone of the message center chief who receives the message. As the message comes in, the message center chief types it on a sheet known as the "rough log." First, he types the message center number and the time; second, the person or organization for whom the message is intended, followed by message classification; third, the body of the message; fourth, the signature; and immediately following the signature he shows sender, receiver, time of receipt, whether or not the message shall become a part of the permanent record, and whether a confirmation will be sent. An example of an incoming message as it is written down on the rough log follows:

14. 530pm (This being the message center number and time.)
CO Gun Group 3 Ewa Sector RX (Meaning that the message is intended for the Commanding Officer, Gun Group 3, and is classified as RUSH.)
HDPH11. (The sender's message center number.) When will you be ready for action?
Riley Jones Smith 532pm Phoned Major Roe 534pm XC

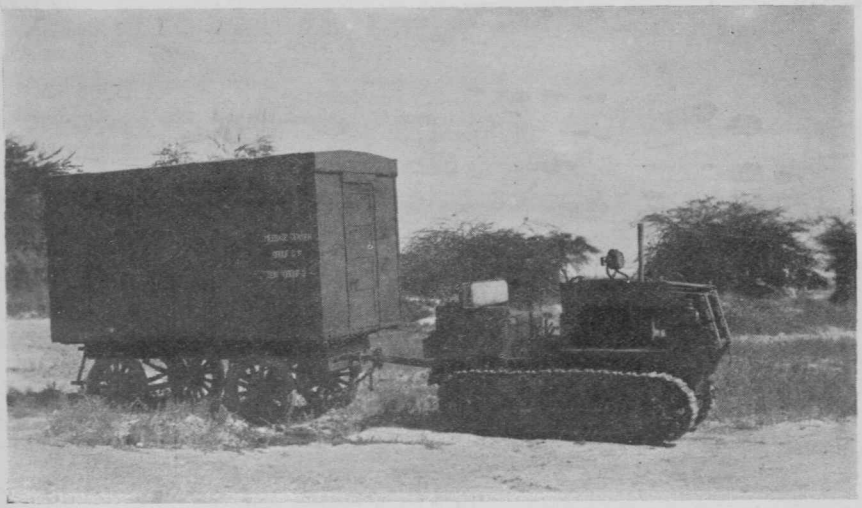


FIG. 6

The message center chief immediately transmits this message to the commanding officer. If it is necessary that it form a part of the permanent record of the message center, the message center chief so indicates by an *x* at the right of the page even with the last line, and if it is desired to send a confirmation copy to the addressee, the letter *C* after the *X* will show that such action is to be taken by the records clerk. Thus, the last line of the foregoing message, as written on the rough log by the message center chief, would read:

Riley Jones Smith 532pm Phoned Major Roe 534 pm XC

It will be assumed that the Commanding Officer's telephone rings in on the Message Center Chief and the Commanding Officer directs him to inform HDPH

that Gun Group 3 will be ready for action at 6:15 p. m. The message center chief immediately calls HDPH and as he writes the message on the rough log, he transmits it to the addressee. It will be assumed that the Commanding Officer spoke to the Message Center Chief at 5:37 p. m. Thus the message will appear on the rough log as follows:

538pm
HDPH RX
Gun Group 3 will be ready for action at 6:15 pm.
CO Gun Group 3 Smith Jones 540pm XC

In that manner the rough log will contain all data regarding the first message and the reply thereto, and will appear as follows:

14. 530pm
CO Gun Group 3 Ewa Sector RX
When will you be ready for action?
Riley Jones Smith 532pm Phones Major Roe 534pm XC

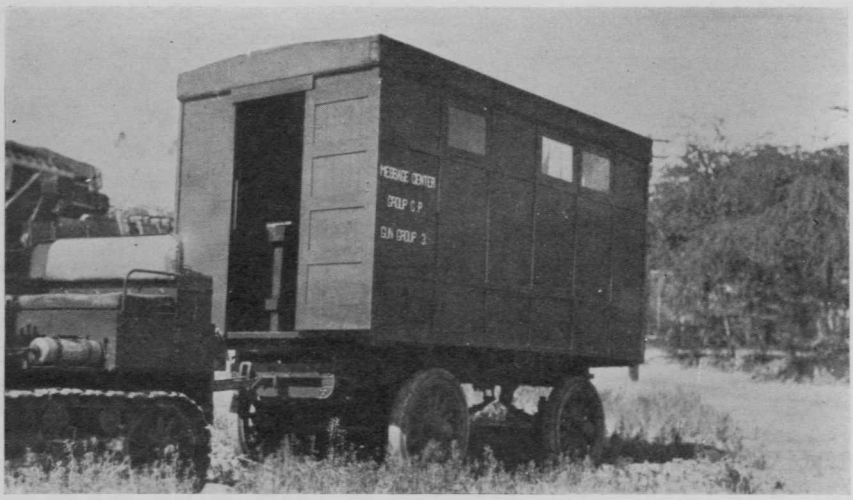


FIG. 7

15. 538pm
CO HDPH RX
Gun Group 3 will be ready for action at 6:15 pm.
CO Gun Group 3 Smith Jones 540pm XC

It is assumed that all messages are sent over the phone. In case telephone communications go out of commission notation will be made as to method of sending message. Assuming that the telephones were out and the message was sent over radio, the last line would then appear:

CO Gun Group 3 Smith Jones 540 pm Radio XC

The message center chief is then ready for the next transmission, has transmitted the first message and the reply thereto, and has included in his rough sheet all data necessary for making an accurate record of the matter.

As the message center chief completes a page of the rough log, he passes it to the records clerk who immediately reads *every* message on the sheet. He looks particularly for those marked *X* or *C*. When he finds one marked *X*, he immediately places the proper message forms in his typewriter and makes a finished message therefrom. He makes an original and one carbon. The original he places in the message center file and the carbon he places aside to be sent in with the war diary.

In case the message is marked *C*, the records clerk makes one additional carbon copy of the finished message and either dispatches it by messenger to the addressee or places it in the proper pigeonhole for distribution.

In this manner the message center register is eliminated, as the rough log will give all data necessary about any message that passes through the message center. The only message form that will be required is the standard type of form used for messages and these may be mimeographed.

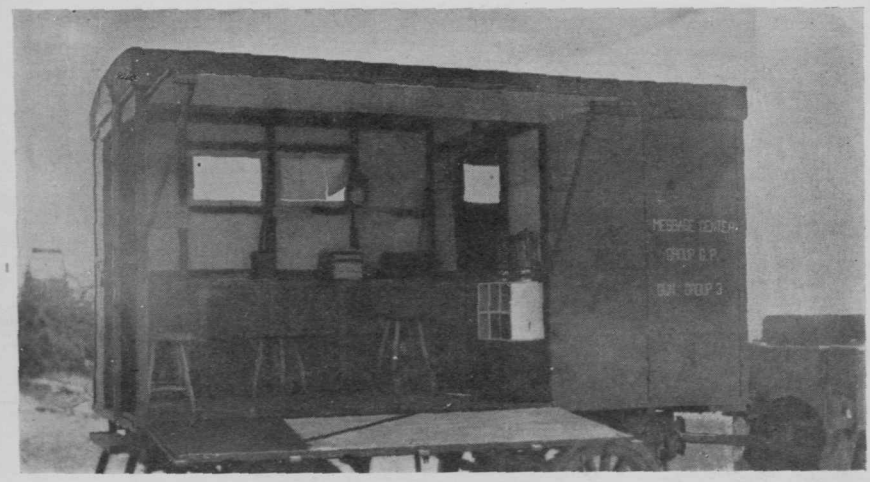


FIG. 8

OPERATION UNDER ORDINARY CONDITIONS

In speaking of "ordinary conditions" it is assumed that one means the time in the operation of the message center when messages are coming through at the rate rate of about fifteen an hour or less. Under such a condition the operation of the message center will present no difficulty, and what is now the highest speed of the War Department method of message center transmission becomes a very low speed of work for the mobile system.

The messages are handled in the manner outlined in the foregoing pages, and each call to the message center is answered by the switchboard operator and placed on the message center chief's telephone, while the message center chief calls for each separate connection as he desires it. For instance, Battery A sends a message to the commanding officer. It will come into the message center, be recorded as it comes in, and after its receipt the chief of message

center dispatches it to the commanding officer, making at the same time a record thereof. Operation in this manner is a leisurely affair with everyone having an abundance of time in which to perform his duties.

Operation at ordinary speeds up to fifteen messages an hour should present no difficulty even to untrained personnel only partially familiar with the function of the message center. It can even be done by writing each message out in longhand.

Operation Under High Pressure

At times during the operations of every mobile unit there comes a period of extreme rush, when every person is working at top speed and every facility for efficient action is worked to capacity. At these times the work of the message center will be increased until messages are going through at the rate of sixty

Fig. 9

or even seventy an hour. In a maneuver held by a mobile regiment of artillery during a recent joint Army-Navy maneuver the records showed that 197 messages were handled through the message center in two hours and fifteen minutes. Not only were the messages undelayed by the making of records, but the record was accurate and complete. Not a message went through that was unrecorded.

It is not possible for the present War Department message center system to function at such high speed, nor has the writer found it possible for it to function at a rate of speed higher than thirty or forty messages an hour. On the other hand, it has been found that under this system the speed of transmission is limited only by the speed at which persons can talk, and with a message center chief who is qualified as a typist of a speed of about 60 words a minute, the records will keep pace with the messages.

Of course, there are many abbreviations that must be used by the message center chief. Such common ones as:

rs=ranging shots
ps=platoon salvos
bs=battery salvos
cof=commence firing
cef=cease firing
rept=report

are used to great advantage when the speed of transmission becomes great.

The Method of Speeding Up

The limit of transmission under the separate connection system is about thirty to forty messages an hour. When messages are coming through at a rate higher than that the following procedure will permit both rapid transmission and accurate recording.

FIG. 10

1. When the rush starts, the chief of message center calls all receiving and sending terminals and tells them to stand by for "open connections." When they are reported ready, he calls upon his telephone operator for "Open Connections."

2. With the present type of field switchboard it is possible to connect every telephone on the board into one series, thereby making it possible for each person on a telephone to talk directly to any other person in the series, and his conversation is overheard by everyone else on the circuit. This is in principle like the old-fashioned "party line" upon which each subscriber could listen to what the other one talked about. As a general rule, when this connection is made the following phones are connected in series:

1. Higher command.
2. Group commander.
3. Message center.
4. Firing battery.
5. Firing battery.
6. Firing battery.
7. Searchlights, etc.

The number of connections is limited only by the number of drops on the switchboard, although it is easy to see that the fewer persons who are connected in series the smaller will be the chance for confusion.

3. When the switchboard operator announces that he has made "open connections," the message center chief will verify the presence of the operator from each unit, and he will then act as a communications control post and permit the senders to talk directly to the receivers, making a record of the conversation as he overhears it through his own phone. If, for instance, the commanding officer desires to assign a target, he merely speaks into his phone as follows (assuming it is 5:30 A. M.):

Battery A. Target Pearl. Cruiser traveling left to right. Fire four ranging shots and report.

The Battery A operator will hear this assignment of target and will immediately transmit it to the range section, having received it direct from the commanding officer without the loss of any time at all.

The chief of message center, as the message is sent by the commanding officer, will write on the rough log something similar to the following:

530am Battery A RX
T&t Pearl cruiser trav lr 4rs and rept
CO Roe Smith XC

In the same manner the commanding officer can assign targets to all batteries. The batteries can report direct to the commanding officer, with the chief of message center making a record of the report and the time.

Assuming that such messages are going over the line and higher command cuts in with an RX message to cease fire. The message center chief will immediately break into the conversation, clear all lines, and give the message.

The great difficulty with this method is the fact that the average operator does not know when to stay quiet. Operators must be instructed to remain silent until they have a chance to call for their party, and with a little drill this can be done easily. There is no difficulty experienced by the one message center of this type in operation. It has been in operation for something like three months without a tie-up in communications.

When the message center chief considers that the critical moment has passed, he may place the message center back on normal operation basis by instructing the telephone operator to "close connections," thus making it necessary to call separately for each message.

The time required for making open connections for a series of twelve telephones is twenty-five seconds. This is an average from twelve tests given. The time required to again close connections is four seconds.

Firing Data for Antiaircraft Gun Batteries

By MAJOR J. C. HAW, 62d Coast Artillery (AA)

NOWHERE has the writer encountered a clear and complete statement of the sources, channels of transmission, and the methods of application of firing data for antiaircraft gun batteries. The various texts describe separate instruments but do not show their combined operation. The summary which follows has been found very useful in teaching gunnery in Officers' Schools.

This description deals solely with fire by Case 1½ (the normal method), in gun batteries equipped with 3-inch guns, model 1918, on auto-trailer carriage, moddel 1917, using the sighting system and fire-control apparatus normally supplied with this gun. The sighting system is described in Ordnance Pamphlet No. 2018 and in such texts as *Gunnery and Position Finding for Antiaircraft Artillery*, published by the Coast Artillery School (see figures 1 and 2). The fire-control apparatus consists of the wind and parallax computer, the data computer, model 1917 (generally known as the R. A. Corrector), and altimeters or a height-finder (see figures 3, 4, and 5). The method of determining firing data with this apparatus is, of course, the "angular-travel" method.

The lateral elements of the sights on the 3-inch gun, model 1918, mounted on auto-trailer carriage, model 1917, have been modified by the Ordnance Department so as to simplify their operation. The operation of these modified sights is as follows: The lateral deflection setter simply sets off the deflection received from the range section; this displaces the line of sight with reference to the axis of the bore. It is then only necessary for the gun pointer to traverse the piece until he is on target.

I. CORRECTIONS USED IN ANTIAIRCRAFT ARTILLERY FIRINGS

1. *a.* Unlike those of seacoast artillery, the fire-control systems now in use by antiaircraft artillery batteries have no provision for the application of corrections computed anew for every position of the target, with the exception of corrections for wind effects and parallax. The latter corrections are computed on the wind and parallax instrument and applied on the R. A. Corrector as described in par. 11 *b.* (4) below.

b. Various corrections are often made, however, in spite of the fact that they are generally applicable to but one position of the target; the battery commander considering that as long as the target is in a certain vicinity these corrections are close enough approximations to improve the accuracy of fire. These corrections will now be discussed.

2. It is possible to correct for non-standard muzzle velocity (if we can determine its true value by firings with screens and chronograph) by constructing

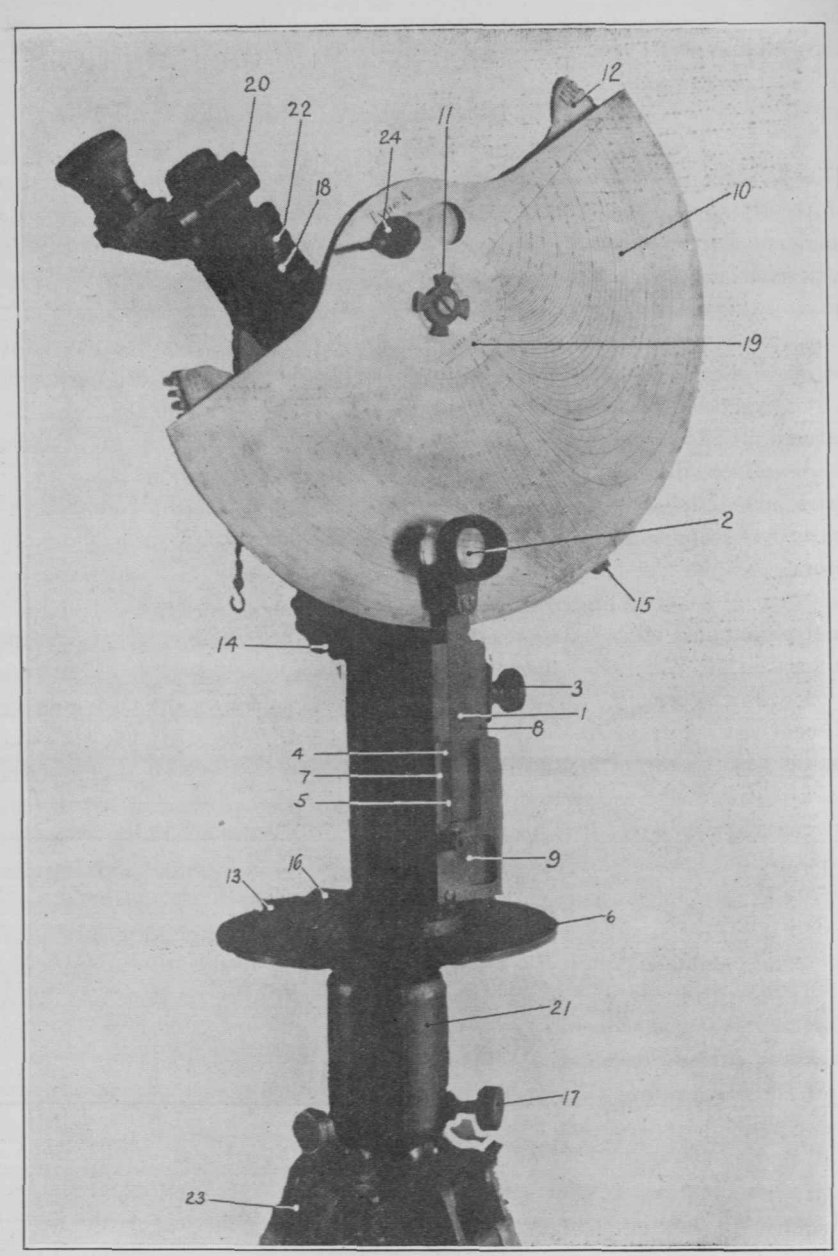


FIG. 1. ALTIMETER, MODEL 1920

1. Altitude scale.
2. Altitude scale pointer.
3. Altitude scale pointer knob.
4. Altitude index (1b).
5. Altitude index (2b).
6. Azimuth circle.
7. Ballistic correction slide.
8. Base-line scale.
9. Base-line index.
10. Curve disk.
11. Curve disk retainer.
12. Curve disk support.
13. Declinator.
14. Elevating handwheel.
15. Elevating compensating index.
16. Level.
17. Leveling screw.
18. Locking pin.
19. Orienting arrow.
20. Sight.
21. Spindle bushing support.
22. Telescope support.
23. Tripod head.
24. Wing nut (curve disk).

new sets of curves for the fuze-range and time-of-flight cylinders on the R. A. Corrector and new curves on the fuze-range disk of the gun; but this is a complicated and tedious process, requiring hours, and does not permit the application of corrections of the moment.

3. *a.* A certain degree of preparation of fire is attainable, nevertheless. This is accomplished by firing trial shots, stripping wind effects from the results, and applying flat corrections for the remaining abnormalities. Obviously, these corrections are absolutely correct for one point only. The solution of the trial-shot problem is described in a bulletin issued by the Chief of Coast Artillery. From trial shots, three corrections are obtained. The corrections to the vertical and lateral deflections are applied on the gun as described in par. 9, below. The correction to the fuze range is applied by the fuze cutter, who sets off on the corrector scale of the fuze setter (instrument) the corrector setting ordered by the battery commander. This setting should be checked, as many fuze setter instruments have so much backlash that each instrument may require an additional correction to compensate for those errors which are produced by mechanical defects. Ten corrector settings are equal to one unit of fuze range.

b. It is apparent from the preceding paragraph that the correction for drift is included in the lateral deflection correction determined from trial shots and set on the gun as described in par. 9 *b.* below.

4. *Adjustment of fire. a.* There is no need to discuss here the difficulties of securing correct reports of deviations from observers located near the battery. In addition, the target is usually under fire so short a time that very few shots are fired after adjustment corrections have been applied, so there is rarely sufficient evidence to prove the worth of the corrections. Further, even in target practice the adjustment correction applied on one course may be worthless on the next due to changes in angular height, which vitiate the worth of the flat corrections. In spite of these difficulties, adjustment of fire is practicable and, under present conditions, necessary. If time permits, the bursts should be brought on to the gun-target line by changes in the vertical and lateral deflection before a range adjustment is attempted. However, deflection and range adjustments are sometimes executed simultaneously.

It is useless to attempt range adjustment unless reliable sensings are available. With the naked eye, it is impossible to "sense" bursts correctly. However, there are two ways in which to determine whether the bursts are over or short; the most reliable way is to have a flank observer stationed as nearly as possible on the prolongation of the course of the target; the other way, which gives good results if a skilled observer is employed on the instrument, is to "sense" the bursts by means of a stereoscopic instrument, usually the height-finder. A coincidence instrument is useless for this purpose.

Once the bursts are brought on to the gun-target line, or nearly on it, by deflection corrections, the range is adjusted by correcting the altitude or by correcting the fuze range. The former method is generally considered to be

the better of the two, since by correcting the altitude the deflections are also affected in the proper direction, while a change in the fuze range affects no other elements of firing data.

b. The mechanics of applying the corrections are as follows:

(1) The vertical and lateral deflection corrections are mentally added algebraically, by the deflection readers, to the algebraic sum of the other deflection corrections and set off on the secondary deflection scales of the R. A. Corrector. (See the several mentions of arbitrary deflection corrections applied during firing, par. 11 below.)

(2) Altitude corrections are applied on the R. A. Corrector (See par. 11 *b* (2) below).

(3) A correction may be applied to the fuze range, to shift the burst along the trajectory. It is applied on the corrector scale of the fuze setter (instrument). (See par. 10 *d.* below.) Ten corrector divisions are equal to one unit of fuze range.

5. *a.* When they are necessary, parallax corrections are computed on the wind and parallax computer and added algebraically to the other corrections, which, combined, are set off on the secondary deflection scales of the speedometers of the R. A. Corrector, as explained in succeeding paragraphs. Ordinarily, however, the R. A. Corrector is placed so close to the guns (70 to 100 yards from center of firing battery) that parallax corrections are unnecessary. In reading the following paragraphs, therefore, remember that the parallax corrections mentioned are usually zero.

b. The correction for wind is computed and applied in the same way. It is based on a ballistic wind. (See reference to wind and parallax corrections in par. 1 *a.*) The wind correction, unlike the parallax correction, is rarely zero.

6. *a. Correction for error in length of altimeter base line.* (Not applicable when a height-finder is used.) This correction may be applied on the B′ altimeter; the altitudes read will then differ from their uncorrected value by the same percentage as the percentage value of the base-line correction. There is rarely any occasion for this correction; however, it is useful when the length of the base line has not been accurately determined. The process would be as follows: Fire trial shots, using altimeters to measure altitude of bursts; strip wind effects from the resulting data; compare the stripped altitude with that expected, thus arriving at a percentage value; the percentage correction can then be applied to the assumed length of base line. Since differential effects of muzzle velocity, etc., are not taken into account, the resulting correction is obviously only an approximation, but it may be valuable when lack of time prevents an accurate survey of the baseline.

b. Correction for difference in elevation of altimeters. If the two altimeters are at different elevations, a correction may be applied. Altimeter instruments are so constructed that by adding one-half the angular difference in elevation to each instrument the altitude determined will be that above the midpoint of the altimeter baseline.

II. Data Required at Guns

7. At the instant of firing a gun at a moving aerial target by case 1½, that is, at the instant that the target is in "present position," the line of sight must bear a certain correct relationship to the axis of the bore. This relationship may be resolved into a vertical angle and a horizontal angle.

a. The vertical angle is the algebraic sum of the following items:

(1) *The vertical deflection,* which in turn consists of the algebraic sum of:

(*a*) *The principal vertical deflection,* which corrects for vertical angular travel of target during time of flight.

(*b*) *The secondary vertical deflection,* which is the algebraic sum of the *arbitrary vertical correction* and the *vertical correction for wind effect and parallax.*

(2) *The super-elevation,* or additional elevation that must be applied to allow for the curve of the trajectory.

b. The horizontal angle is the *lateral deflection,* composed of the algebraic sum of:

(1) The *principal lateral deflection,* which corrects for the lateral angular travel of target during time of flight.

(2) The *secondary lateral deflection,* which is the algebraic sum of the *arbitrary lateral correction* (including the *correction for drift*) and the *lateral correction for wind effect and parallax.*

8. It is also necessary to set the fuze of the projectile, which requires a knowledge of the *future fuze range* and the *corrector setting.*

III. Sources and Application of Data Reaching Gun

9. Certain of these items reach the guns from the sources named below and are applied as indicated:

a. The arbitrary vertical correction determined from trial shots is announced by the battery commander and set on the arbitrary vertical correction scale which is mounted on the right trunnion of the cradle of the piece.

b. The arbitrary lateral deflection determined from trial shots is announced by the battery commander and set on the lateral deflection scale on the sight by making a new index mark in pencil.

10. All other data (except the corrector setting), reach the gun from the R. A. Corrector.

a. Vertical data.

(1) The deflection received at the gun continuously by telephone, from the vertical deflection reader of the R. A. Corrector detail and set off on the vertical deflection scale on the right trunnion of the cradle, is actually the algebraic sum of the following angular values:

(a) The principal vertical deflection.

(b) The vertical correction for wind effects and parallax.

(c) Arbitrary vertical corrections ordered by the battery commander *during* firing.

(2) The super-elevation is set off by the operation of the fuze range disk and pointer. Its value is received in the guise of a future fuze range called out by the fuze cutter as each fuze is set, he in turn having received this future fuze range by telephone every four seconds from the range reader of the R. A. Corrector detail.

b. Lateral data.

The deflection received at the gun continuously by telephone from the lateral deflection reader of the R. A. Corrector detail is the true lateral deflection (algebraic sum of principal and secondary lateral deflections), except that the arbitrary lateral correction item included in it is only the arbitrary lateral correction ordered *during firing*, and is exclusive of the arbitrary lateral correction determined from trial shots. This lateral deflection received from the R. A. Corrector is set on the lateral deflection scale of the sight on the left of the gun.

c. Arbitrary vertical and lateral corrections ordered *during firing* are thrown into the R. A. Corrector because it is not practicable to set them on the gun while firing is in progress.

d. Fuze setter data.

The fuze cutter sets off on his fuze setter (instrument) the future fuze range received by telephone every four seconds from the range reader of the R. A. Corrector detail; the corrector setting ordered by the battery commander is set off on the corrector scale of the fuze setter instrument by another cannoneer.

IV. The R. A. Corrector

11. *The R. A. Corrector.* (Reference numbers refer to Fig. 2.)

a. From the above, it is evident that the R. A. Corrector turns out vertical and lateral deflections (both without corrections determined from trial fire) and future fuze ranges.

b. The following data must be supplied to the R. A. Corrector from outside sources:

(1) The *altitude* is obtained by a height finder or by altimeters at the ends of a base line. It is set by setting the altimeter pointer (20) to the proper altitude on the altitude scale (19). This operation automatically revolves the time of flight cylinder, thus inserting the altitude factor into both vertical and lateral deflection computations; and automatically revolves the fuze range cylinder also, thus inserting altitude into the fuze range computations.

(2) *The altitude correction*, if any, is announced by the battery commander. It is set on the altitude correction scale (21) by moving the altitude scale proper (19), thus applying the correction to every subsequent setting of the altitude pointer (20) since the latter is always set opposite some

specified graduation of altitude scale (19). Obviously this is a *flat* correction.

(3) *Arbitrary vertical and lateral corrections* may be announced by the battery commander while firing is in progress. They are mentally added algebraically to the wind and parallax corrections and the resulting values are set as secondary deflections on the speedometers by moving the indices (72) and (65) to the proper setting on the correction scales (73) and (66). The movement of these pointers revolves the deflection scales (70-71) and (63-64), from which the deflections sent to the guns are read. The "complementary term" correction is also set on the secondary deflection scale of the vertical speedometer. (See par. 11 *c* (1), below.)

(4) *Wind and parallax corrections.* These are obtained from the wind and parallax instrument. The preceding sub-paragraph explains how they are applied to the R. A. Corrector.

c. By the operation of the instrument itself, vertical and lateral angular velocities are measured and the data to be sent to the guns are computed. We will consider the computation of the fuze range later.

(1) No secondary lateral deflections, other than the corrections already discussed, are set off on the lateral speedometer. On the vertical speedometer, however, it is necessary to set off on the correction scales (73) and (66) a "complementary term" (always negative) which corrects for an error in the computation of the time of flight used in determining the vertical deflection. The "complementary term" correction is mentally added algebraically to the other secondary vertical corrections and the resulting value set on the vertical speedometer as described in par. 11 *b.* (3) above. The "complementary term" correction is obtained by reading the "complementary term" cylinder under the pointer (51); this cylinder (55) is revolved manually so that it is always set at the lateral deflection read from the lateral speedometer, while the pointer (51) is moved automatically by the movement of the vertical telescope proportionally to the angular height.

(2) Since we have now considered all the elements which enter into the setting of the speedometer scales, we can turn our attention to the speedometer pointers or needles (69 and 62) whose positions indicate final deflections to be sent to the guns. It is evident that we have accounted for all elements of the vertical and lateral deflections computed by the R. A. Corrector except the predictions for travel of target during time of flight. Without going into the details of mechanisms or mathematics, we will consider the methods by which the speedometer needles are given the correct angular displacement. Each needle is actuated by a small upright disk in contact with a large horizontal disk, which in turn is revolved by the movement of the corresponding sight. Obviously the speeds of rotation of the horizontal disks are proportional to the angular speeds of the target, while, by moving the small upright disks radially with respect to the horizontal disks by amounts proportional to the time of flight, the rate of rotation of the small upright disks, and the consequent angular displacement of the speedometer needles, will be proportional

to the travel of the target during the time of flight. It is therefore necessary to determine the value of the time of flight and apply it.

(a) *For Vertical Deflection.* The vertical disk (41) is displaced radially with respect to the horizontal disk below it by moving the vertical time pointer (34) to the proper t″ curve on the *left* of the corrected time cylinder. The t″ curve to be used is that whose value is read on the time of flight cylinder under the time of flight pointer (29). (This pointer is moved automatically by the vertical motion of the sights proportionally to the angular height, while the time of flight cylinder, as stated in par. 11 *b* (1), above, is automatically set when the altitude is set off.) But the corrected time cylinder must also be properly set; this is done by revolving it until the vertical deflection (read from the vertical deflection speedometer) is set off under the vertical deflection setting pointer (31); this pointer is moved automatically by the vertical motion of the sights proportionally to the angular height.

(b) *For Lateral Deflection.* The small upright disk (42) is moved radially with respect to the horizontal disk beneath it by moving the lateral time pointer (38) to the correct *t″* curve on the *right* of the corrected time cylinder. As in the case of vertical deflection, the *t″* curve to be used is that whose value is read from the time-of-flight cylinder under the time-of-flight pointer; while the settings of the corrected time cylinder and time-of-flight cylinder have already been described.

d. Future Fuze Range is read on the fuze range cylinder under the fuze range pointer (25). As already stated, the fuze range cylinder is automatically set by the operation of setting off altitude. The fuze range pointer is moved automatically by the vertical motion of the sights proportionally to the angular height, and is further displaced by the operation of moving the dead-time pointer (56). The dead-time pointer is moved manually to set off on the dead-time cylinder the value of the principal vertical deflection, obtained from the vertical speedometer. The dead-time cylinder is moved automatically whenever the vertical time pointer (34) is moved.

12. The following summation of certain points about the R. A. Corrector will assist in fixing upon the mind its construction and mode of operation, but note that these points cover certain selected phases only:

a. Dead time affects the fuze range only; it is not considered in computing vertical and lateral deflection.

b. The "complementary term" affects vertical deflection only; it is not considered in computing lateral deflection and fuze range.

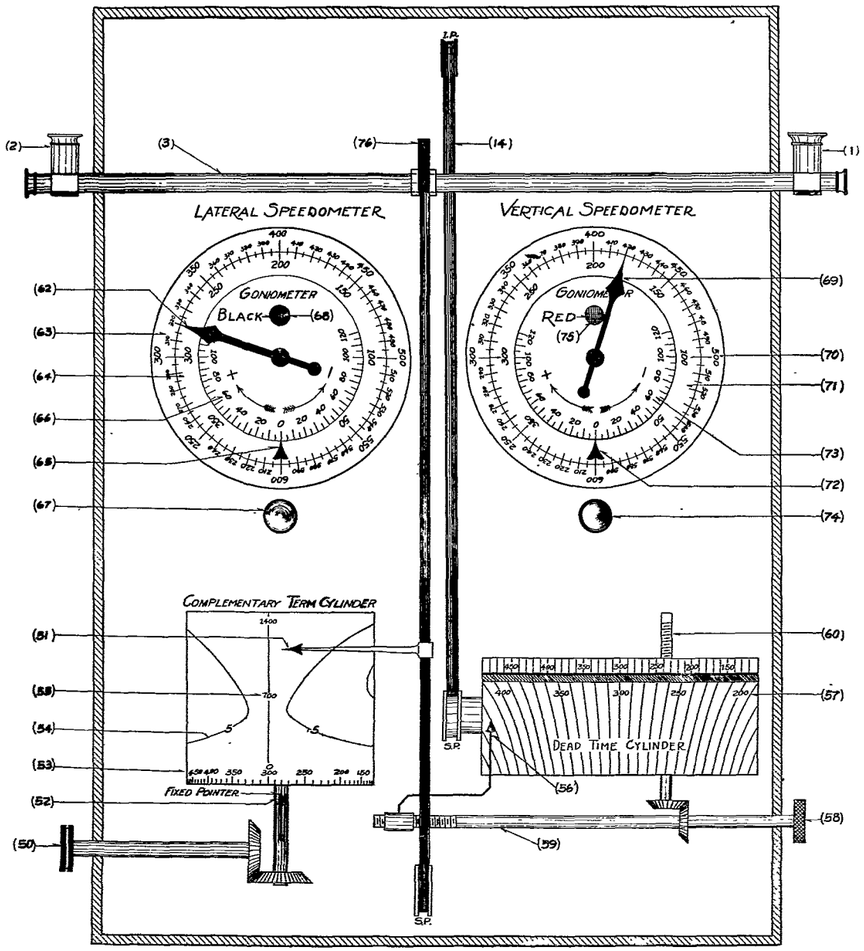
c. The operation of setting off the altitude by moving the altitude pointer (20) along the altitude scale (19) revolves the time-of-flight cylinder and the fuze range cylinder.

d. The vertical motion of the telescopes moves the following parts proportionally to the angular height: vertical deflection setting pointer (31), present angular-height pointer (30), time-of-flight pointer (29) (these three pointers are connected rigidly together); fuze range pointer (25) and future

ANTI-AIRCRAFT DATA COMPUTER, MODEL 1917.

COMBT ARTILLERY SCHOOL
FORT MONROE, VA.
DATE APRIL 12, 1926
DRAWN CAPT. J.T. LEMLY JR. C.A.C.
TRACED [illegible]

FRONT



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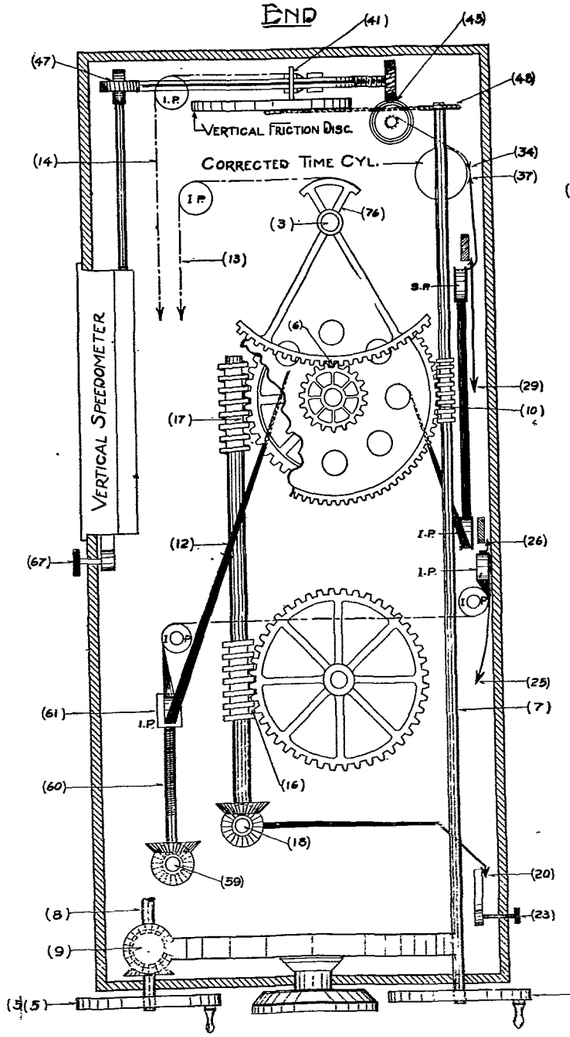
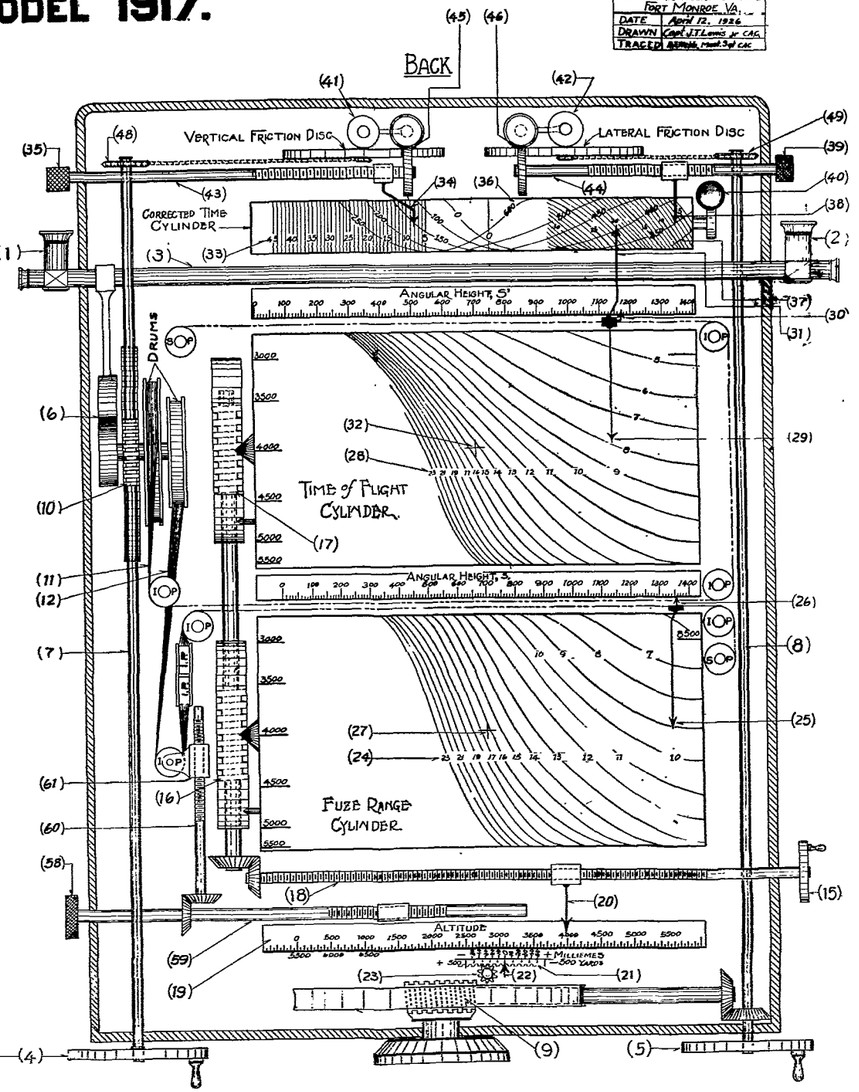


BACK



angular-height pointer (26), which are rigidly connected and are further displaced automatically by the operation of setting the dead-time pointer (56); complementary term pointer (51). Thus a total of six pointers is moved by the vertical motion of the telescopes.

e. The dead-time cylinder is revolved automatically by the operation of setting the vertical time pointer (34).

f. The following operations are accomplished manually: setting of corrected time cylinder; setting of dead-time pointer (56); setting of complementary term cylinder; setting of lateral time pointer (38) and vertical time pointer (34); setting of lateral and vertical deflection scales (63-64 and 70-71) by moving indexes (65) and (72) to proper settings on secondary deflection scales (66) and (73); setting of altitude correction by moving altitude scale (19); setting of altitude pointer (20).

13. It is evident that the lateral and vertical deflection readers, especially the latter, must be nimble mental gymnasts in order to arrive at the true algebraic sum of the many corrections which are combined to form the secondary deflections, and to set off the resulting values properly on the secondary deflection scales and to perform their other duties. Hence, in order to avoid errors, the corrections ordered should be reduced to the minimum.

V. Wind and Altitude Data

14. Data for wind and altitude are determined independently of the R. A. Corrector and supplied to that instrument.

a. A ballistic wind is determined by the meteorological section. In antiaircraft fire, the weighting factors are often taken as unity; that is, the winds in the different atmosphere layers of equal depth are considered to affect the trajectory equally. The wind and parallax instrument resolves the wind effect into lateral and vertical effects for every position of the target, and these data are supplied to the R. A. Corrector and set off as described in par. 11 *b.* (4) above.

b. The determination of altitude and its application on the R. A. Corrector are discussed in par. 11 *b.* (1) above.

Early Coast Fortification

IT is a singular fact that of all the plans submitted to Congress at the close of the Revolutionary War looking to the organization of a peacetime military establishment, not one took into consideration the necessity of providing for the defense of the maritime frontier. During the war, coast defense had been a function of the several States, the Government finding it necessary to devote its entire attention to defeating the enemy in the field. It is probable that the proponents of the peace measures considered—if they thought of the matter at all— that the States could continue to furnish their own coast fortifications, but if so they neglected the obvious fact that the States had not theretofore provided effective fortifications. Even during the colonial period, the defenses had almost invariably been inadequate to the requirements; and at the close of the Revolution there were few coastal works not in ruins, and none in a serviceable condition.

In the years immediately following the disbanding of the Continental troops, the entire force—too small to be called an army—in the service of the United States was employed along the land frontiers. The artillery was armed as infantry and served as infantry. The only difference between the two branches was that the artillery also served the guns in the frontier forts and those taken on expeditions against the Indians. Properly speaking, they were artificers, rather than artillerymen, and when the time came to take up their duties in coast defense they were unprepared.

The threat of war with Great Britain, growing out of disputes over unsettled boundaries and over British treatment of American seamen, turned the eyes of the infant nation from the depths of the backwoods to the undefended seaboard. Here was opening up an entirely new field of service for the artillery, one which brought about the reorganization and expansion of that branch of service under the act of May 9, 1794.

Before this date, however, the fortification of the coast had been begun. On February 27, 1794, a committee had recommended to Congress the fortification of sixteen points along the Atlantic shore line—Portland, Portsmouth, Cape Ann, Salem, Marblehead, Boston, Newport, New London, New York, Philadelphia, Baltimore, Norfolk, Wilmington (N. C.), Ocracoke Inlet, Charleston, and Savannah, to which Wilmington (Del), Annapolis, Alexandria, and Georgetown (S. C.) were subsequently added. On March 20, Congress appropriated the necessary funds, and by the end of the year the project was near completion save in Boston Harbor and at one or two other points.

This first project contemplated the erection of earthen batteries, faced with timbers at such places where earth of an adhesive quality could not be obtained.

The strictest economy was necessary, and it was felt that a tenacious earth, properly sloped, sodded, and seeded with knot-grass, would be durable and would afford sufficient protection so far as naval attacks were concerned.

Naval science had not then developed to a point where landings in force on an open beach were considered practicable, and the coast batteries were therefore required only to prevent the use of harbors and wharves by the enemy and to protect communities from bombardment. Small landings on beaches were, nevertheless, practicable, and the batteries themselves required protection from land attack or raids. This introduced into coast defense a conception from which the Coast Artillery is still suffering—local defense by the artillerymen themselves.

In the immediate vicinity of each battery, or group of batteries, particularly where the battery occupied an exposed position at a distance from the town it defended, on a point of land, or on an island, there was to be erected a strong redoubt or other inclosed work (or a blockhouse for batteries of lesser importance), in which one or two pieces of light artillery would be mounted. This redoubt, or blockhouse, thus became a barrack for the garrison and a citadel protecting the battery from attack from the landward side. In case of such an attack, the apparent idea was that the gunners would retire to the citadel, take up the small arms with which they were provided, and become infantry for the time being—an idea which the Artillery accepted without protest until within very recent years.

The weapons best suited for the coast forts were considered to be the 24 and 32-pounders, of which the entire project called for about 450. Of these, it was thought that 150 could be obtained from materiel on hand and 150 from guns in possession of the States, leaving about 150 to be manufactured. To allow for possible shortages, the purchase of one hundred of each of these heavier calibers was authorized by Congress.

At that time there was on hand a great variety of calibers remaining from the Revolutionary War. The return of ordnance, arms, and implements, of December 14, 1793, shows 214 iron guns, 49 iron howitzers, 2 iron mortars, 2 iron cohorns, 153 brass guns, 43 brass howitzers, 63 brass mortars, and 1 brass cohorn. The calibers included: Iron, 1, 2, 3, 4, 6, 9, 12, 18, and 24-pounder cannon, 3½ and 5½-inch howitzers, 13-inch mortars, and 18-pounder carronades; brass, 2, 3, 4, 6, 8, 12, and 24-pounder guns, 2¾, 4½, 5½, and 8-inch howitzers, and 4.4, 4½, 5½, 8, 10, 13, and 16-inch mortars. The following were available among the heavier types:

	Iron	*Brass*
24-pounder	12	3
18-pounder	36	—
12-pounder	49	11
8-inch howitzer	—	18
5½-inch howitzer	2	17
16-inch mortar	—	1
13-inch mortar	2	4

10-inch mortar	---	19
8-inch mortar	---	3
5½-inch mortar	---	19
	103	92

Prior to 1800 there was no noteworthy change in the calibers of artillery constructed for seacoast artillery. The 42-pounders was added in 1801 and the 50-pounder Columbiad in 1811. In the project of 1818, these, as well as the 100-pounder, formed a part of the seacoast materiel.

The guns available in 1794 were of both brass and cast iron. Though more expensive than cast iron, brass cannon were favored because there was less danger of bursting. The Revolution had practically compelled the colonists to use the iron and thus demonstrate its possibilities, and there ensued a long contest between the two metals (the brass being substantially what was afterwards known as bronze), with cast iron steadily growing in favor. In the end it displaced brass, only itself to be superseded at about the opening of the Civil War. In the heavier guns for coast defense, the project of 1794 established cast iron as the metal to be used, and from that time until wrought iron appeared, no other metal was used for the heavy coast cannon.

The multiplicity of calibers was not, of itself, a great inconvenience, but there were many varieties of each caliber, owing to the fact that each foundry cast its guns according to its own plans. This led to great confusion in the manufacture of gun carriages. These carriages were, as a rule, wooden frames, although there were also carriages made in two parts—a chassis and a top carriage. In 1818 cast-iron carriages were adopted to replace those made of wood, but in 1839 a reactionary spirit brought the wooden carriage again into favor, where it held its place for fifteen years before being definitely and finally displaced.

The project of 1794 contemplated the use of two kinds of carriages for the seacoast armament—"coast" carriages (which might be casemate or barbette) and "traveling" carriages. These latter, which must not be confused with the "light field" carriages, are particularly worthy of note in view of the use of mobile artillery in coast defense today.

The term "traveling carriage" was not applied to the carriages of any particular calibers. There were "heavy" and "light" guns for every caliber in the service. Light field carriages were used with the light guns of whatever calibers constituted the field artillery of a force in the field. The traveling carriage, less mobile and more rugged in construction, was used to transport every type of "heavy" gun, and was therefore as necessary with the heavy 6-pounder as with the heavy 24-pounder. Guns mounted on traveling carriages were employed as siege or garrison artillery or, in battle, as guns of position. In coast defense they were, as a rule, held in reserve, to be moved into position when and where danger threatened.

The construction and occupation of the works of 1794 demanded both engineers and artillerists, of which the Army possessed neither. Pending the organization of the Corps of Artillerists and Engineers, the Government employed a number of civilians as temporary engineers to put up the necessary works. Stephen Rochefontaine, assigned to the New England coast from New London north, was the most capable of the engineers so employed, and by the end of the year had his works practically completed, except at Boston, where the Governor would not approve the plans without the sanction of the Legislature, which delayed taking action. Charles Vincent, appointed engineer for New York; John Jacob Ulrick Rivardi, for Baltimore and Norfolk; and Paul Hyacinte Perrault, for South Carolina and Georgia, had their portions of the project well under way by December. Charles L'Enfant, engineer for Philadelphia and Wilmington; John Vermonnet, for Annapolis and Alexandria; and Nicholas Francis Martinon, for North Carolina, accomplished little.

The project called for a battery, a redoubt, and a blockhouse each at Portland, Portsmouth, Governor's Island (Boston), New London, Groton, Governor's Island (New York), Paulus Hook, Baltimore, Norfolk, Wilmington (N. C.), Charleston (three sets), and Savannah; a battery and a blockhouse each at Gloucester (Cape Ann), Salem, Marblehead, in New York City (several sets), and Ocracoke Inlet; traveling carriages, with no battery, at Newport; and repair of works only at Castle Island (Boston), Goat Island (Newport), and Mud Island (Delaware). The total estimated cost was $76,053.62 for the fortifications, and $96,645.00 for the manufacture of two hundred cannon.

With the dissipation of the war clouds there was a relaxation in the matter of coast defense, although some work continued. The first project may be considered to have been complete by the end of 1795, but almost at once preparations on a second project became necessary, for war with France appeared to threaten. The earthen works of 1794 had deteriorated rapidly and large appropriations were necessary to effect repairs. Philadelphia, New York, Newport, Baltimore, and Charleston were considered inadequately defended and large sums were spent at these points in new construction. No new places appear in the project of 1798, but Cape Ann, Wilmington (Del), Annapolis, Alexandria, and Georgetown (S. C.) disappear. At a few of the other harbors no funds were spent, but at most of them some repairs were found necessary. Later, the Louisiana purchase brought New Orleans into the program.

At this time the artillery was scattered in many small detachments along the seacoast and on the land frontier. The largest detachment, in December, 1802, consisted of 118 officers and men at New Orleans; and no other exceeded seventy-five. Ten stations were garrisoned by from fifty to seventy-five officers and men; twelve had from twenty-five to fifty; and four numbered less than twenty-five. It was therefore impractisable to keep the coast forts in good repair, especially those not garrisoned. In 1807, under the stress of imminent war with Great Britain, the necessity for the repair of the coast defenses brought about an entirely new project.

In December, 1807, the Government, in preparing this new program, classified the harbors into the more important ports and those of minor importance. In the two groups it listed practically all the ports and harbors of the Atlantic and Gulf seaboards, and then, from fear that some might have been overlooked, it made provision for other places that might be found to require defense. Work was undertaken promptly and was advanced rapidly. By February, 1810, $640,000 had been expended. When the war actually broke out, the project was essentially complete; at which time the results of the three programs—1794, 1798, and 1807—were about as follows, all works being in good condition unless otherwise stated:

Passamaquoddy: Fort Sullivan, erected on Moose Island in 1808-1809, was a circular battery of stone, mounting four heavy guns, covered by a blockhouse.

Machias: Under the project of 1807 there was erected a circular battery of stone, mounting four heavy guns, covered by a blockhouse.

Penobscot: Under the project of 1807 there was erected a small inclosed battery, mounting four heavy guns.

Castine: Fort George, at Robinson's Point, on the east side of St. George's River, erected in 1808-1809, was a small inclosed battery, mounting three heavy guns.

Damariscotta: On the southeastern angle of Narrow Island, and in the town of Boothbay, on the Damariscotta River, there was erected, under the project of 1807, a small inclosed battery, mounting three heavy guns, covered by a blockhouse.

Edgecomb: On Davis' Point, on the east side of Sheepscot River, there was erected a small inclosed battery, with six heavy guns, covered by a blockhouse, as a part of the project of 1807.

Georgetown: On Shaw's Point, on the west side of the mouth of Kennebec River, there was erected in 1808 an inclosed work, with a battery of six heavy guns.

Portland: Fort Sumner, authorized in 1794, was built on the hill formerly occupied by Fort Allen as a small inclosed work with parapets supported by stone walls and sod; largely rebuilt in 1798-1799, and kept in repair until 1802; comprised also a blockhouse and a detached battery for heavy cannon near the water; rebuilt in 1808 as a battery of five guns, with a brick gun house containing four and eighteen-pounders on traveling carriages. *Fort Preble* (1808), on Spring Point, at the entrance to the harbor, was an inclosed star fort of stone and brick masonry, with a circular battery with flanks, mounting fourteen heavy guns. *Fort Scammel* (1808), on House Island, opposite Fort Preble, was a circular battery of masonry, mounting fifteen heavy guns, covered in the rear with a wooden blockhouse mounting six guns.

Portsmouth: Fort Constitution, on the eastern point of Newcastle Island, at the entrance to Piscataqua River, three miles below Portsmouth, was begun in 1794 as a fort of masonry and sods, with a citadel; practically rebuilt in 1800-1801, it was completed under the project of 1807 as an irregular work of

masonry, mounting thirty-six heavy guns. *Fort McClary* (1808), on Kittery Point, opposite Fort Constitution, was a circular battery of masonry, inclosed by earth and palisades, mounting ten heavy guns. In *Portsmouth,* a brick arsenal (1808) contained three 24-pounders and three 18-pounders on field carriages.

Newburyport: On the east point of Plum Island, at the mouth of Merrimac River, an inclosed battery of timber and earth, mounting five heavy guns, was built as part of the project of 1807.

Gloucester (Cape Ann): In 1794 a battery and a blockhouse were erected at the head of the harbor on the site of an old fort. Omitted from the project of 1798. An inclosed battery, mounting seven heavy guns, covered with a blockhouse, was erected under the project of 1807.

Salem: Fort Pickering, situated on the west side of the harbor entrance, was erected in 1794 on the site of old Fort William as an inclosed work of masonry and sods; repaired in 1800 and improved in 1808 to mount six heavy guns.

Marblehead: Fort Sewall, situated on the west point of the entrance to the harbor, erected in 1794 on the site of an old fort, was an inclosed work of masonry and sods, covered with a blockhouse; rebuilt in 1799 and improved in 1808 to mount eight heavy guns.

Boston: Boston Harbor was included in the project of 1794, but delay in securing State approval of the plans prevented any work except a limited amount of repairs among the ruins of *Castle William,* on Castle Island, on the south side of the inner harbor. *Fort Independence,* a regular pentagon, with five bastions of masonry, mounting forty-two heavy guns, and two batteries for six guns, was begun in 1800, practically completed in 1803, and extensively repaired under the project of 1807. *Fort Warren,* on the summit of Governor's Island, opposite Fort Independence, a star fort of masonry, mounting twelve guns, was erected under the project of 1807. On the south point and the west head of the island, circular batteries of masorny, mounting ten guns each, were also constructed.

Charlestown: Near the Navy Yard, on the point formed by Charles and Mystic Rivers, a circular battery of earth, on a stone foundation, mounting eight heavy guns, was erected in 1808.

Plymouth: On Gurnet Point, at the entrance to the harbor, an old inclosed fort, mounting five guns, was repaired with stone and sod in 1808.

New Bedford: On Eldridge Point, at the entrance to the inner harbor, an inclosed work of masonery, mounting six guns, was erected in 1808.

Newport: In 1794, a fort on Goat Island, a guard house on Tammany Hill, and a battery at Howland's Ferry were erected. *Fort Adams,* on Briton (Brenton) Point, on the east side of the entrance to the harbor, was an irregular star fort of masonry, with an irregular indented work of masonry adjoining it, mounting seventeen heavy guns, begun in 1798 and repaired and extended in 1808. *Fort Wolcott,* on Goat Island, in the center of the harbor, was a small inclosed irregular work, with open batteries, extending from two opposite

flanks, of stone and earth, mounting thirty-eight heavy guns; principally built in 1798 on the site of the 1794 fort, and repaired and extended in 1808. On *Rose Island,* situated to defend the north and south passages of the harbor, a regular work of masonry with four bastions (two of them circular), to mount sixty guns, was begun in 1798, but was left unfinished. On a bluff of rocks called the *Dumplins,* on Conanicut Island, nearly opposite Fort Adams, a circular tower of stone, with casemates, was begun in 1798, but was left unfinished. On *Eaton's Point,* at the north point of the town, an elliptical stone battery had been erected, but was in ruins by the end of 1811. In Newport were some guns on traveling carriages.

Bristol: Ten guns on traveling carriages protected this town under the project of 1807.

Stonington: A brick arsenal, with four 18-pounders on traveling carriages, was provided by the project of 1807.

New London: Fort Trumbull, situated on the west side of the harbor, was an inclosed irregular work of masonry and sod, mounting eighteen heavy guns, erected during the Revolutionary War, repaired in 1794-1795, restored in 1799, and further improved in 1808.

Groton: A fort of earth and sods was begun in 1794, but was left unfinished.

New Haven: Fort Hale. on the eastern side of the harbor, was an elliptical inclosed battery, mounting six heavy guns, erected in 1808-1809.

New York: Fort Jay, on Governor's Island, within half a mile of the city, was a regular inclosed work, with detached batteries for heavy cannon and mortars. The first fort, of earth, with two detached batteries, which had been built in 1794-1795, was rebuilt in 1798-1801 at considerable expense; but in 1806 the whole was demolished (except walled counterscarp, grate, sallyport, magazine, and two barracks) and removed as rubbish to make room for a new work of the same shape. *Fort Columbus,* built on the site of Fort Jay, was a regular inclosed pentagonal work of masonry, with four bastions and a ravelin, mounting sixty heavy guns. *Castle William,* on a projecting point of rocks at the western extremity of the island, begun in 1808, was a stone tower, with fifty-two 42 and 32-pounders, mounted in two tiers, under a bomb-proof roof, with a terrace above intended to mount twenty-six 50-pounder Columbiads. *Bedloe's Island,* nearly opposite Governor's Island, was provided with a battery in 1794. *Fort Wood.* a star fort of masonry, mounting twenty-four heavy guns, with a brick arsenal, was erected in 1809-1810. *Ellis (Oyster) Island,* opposite Fort Columbus, was also provided with a battery in 1794-1795. *Fort Gibson,* an inclosed circular battery of masonry, mounting fourteen heavy guns, was erected in 1809 to cover the entrance to North River. In *New York,* a formidable battery of heavy cannon and mortars, erected at the southwest point of the city in 1794-1795, was in ruins by 1806. *Castle Clinton,* an inclosed circular battery of stone, mounting twenty-eight heavy guns, was erected in 1809 about a hundred yards in front of the west head of the grand battery. *Humbert Battery*

an inclosed circular stone battery, mounting sixteen heavy guns, was built in 1809 one mile up North River. Within the city was a brick arsenal, with one brass 24-pounder, seven 12-pounders, 4 brass howitzers, and twenty-two iron 18-pounders, all on traveling carriages; and three miles above the city was a brick arsenal and laboratory.

Sagg Harbor: Under the project of 1807, a brick arsenal, with four 18-pounders on field carriages, was provided.

West Point: Fort Putnam was repaired and altered in 1794-1795.

Philadelphia: A fort on Mud Island, seven miles below Philadelphia, was begun in 1794, and a large pier, as a foundation for a battery, was laid on a sand bar opposite the island. *Fort Mifflin,* principally built in 1798-1800 and extensively repaired in 1808-1809, was an irregular inclosed work of masonry, defended by bastions, demi-bastions, etc., mounting twenty-nine heavy guns, with a water battery without the works, mounting eight heavy guns.

Wilmington, Del.: A site was selected and surveyed in 1794, but no works were erected. A brick arsenal, with four 12-pounders on field carriages, was built in 1809.

Newcastle: A brick arsenal, with four heavy guns on field carriages, was built in 1809.

Baltimore: Under the project of 1794, a battery was erected and some guns mounted. *Fort McHenry,* at the entrance to the harbor, erected principally in 1798-1800, was a regular pentagon of masonry, mounting thirty guns, with a water battery, mounting ten heavy guns.

Annapolis: A site was selected and surveyed in 1795 and some preliminary work was done, but an unfavorable report caused the project to be abandoned. *Fort Madison,* at the western entrance to the harbor, erected in 1809, was an inclosed work of masonry, comprehending a semi-elliptical face, with circular flanks, mounting thirteen guns. *Fort Severn,* on Windmill Point, a circular battery of masonry, mounting eight heavy guns, was erected in 1809.

Washington: Fort Washington, at Warburton, on the east side of Potomac River, between Alexandria and Mount Vernon, erected in 1808-1809, was an inclosed work of masonry, comprehending a semi-elliptical face, with circular flanks, mounting thirteen heavy guns, defended in the rear by an octagon tower of masonry, mounting six guns.

Alexandria: Some progress had been made in the construction of works in 1795, but an unfavorable report upon the plans caused the project to be abandoned.

Norfolk: Fort Nelson, on the western side of Elizabeth River, begun in 1794, extensively repaired and improved in 1802-1804, and again repaired in 1808, was an irregular work, defended by whole and half bastions, built of brick and sods, inclosed in the rear by a brick parapet, mounting thirty-seven guns. *Fort*

Norfolk, on the northeastern side of Elizabeth River, a thousand yards distant from Fort Nelson, erected in 1794-1795 and rebuilt in 1808-1809, was an irregular inclosed work of masonry, comprehending a semi-elliptical battery, defended on the flanks and rear by irregular bastions, mounting thirty heavy guns.

Hood's Point: Fort Powhatan, on James River, begun in 1808, was a strong battery of masonry, intended for thirteen guns, but unfinished in 1811.

Ocracoke Inlet: The foundation of a fort was laid on Beacon Island in 1794, but no further work was done; in 1799 an inclosed work was ordered on the ruins of the former work, but none was erected.

Wilmington, N. C.: Fort Johnston, on the right bank of Cape Fear River, twenty-eight miles below Wilmington, was originally a colonial fort. In 1794, a battery was erected on the site of the old fort, and in 1799-1800 some progress was made in constructing new works. Delays prevented the completion of the fort until after 1806. As finished, it was a flank battery of tapia, mounting eight heavy guns.

Beaufort: Fort Hampton, on Old Topsail Inlet, erected in 1808-1809, was a small inclosed work, mounting five guns.

Georgetown, S. C.: A battery was begun in 1794, but was abandoned because of the unhealthfulness of the site. *Fort Wingaw,* a small battery and blockhouse, was erected in 1809.

Charleston: Charleston was included in the projects of 1794 and 1798, but, since the State had not then ceded any sites to the United States, little was accomplished until the project of 1807. *Fort Johnson,* on James Island, *Fort Moultrie,* on Sullivan's Islands, at the entrance to the harbor, and *Fort Pinckney* were colonial or Revolutionary War forts. In 1794 Fort Johnson was ordered repaired and foundations for forts were laid at Forts Moultrie and Pinckney. Work was soon suspended, except for a battery (*Fort Mechanic*) in Charleston, which was completed by the mechanics. In 1798-1799 the old works were repaired and improved but were practically demolished by an unusual storm in 1804. As rebuilt under the 1807 project, *Fort Johnson* was a marine battery of irregular form, built of brick and wood, mounting sixteen guns; *Fort Moultrie* was a brick work of irregular form, presenting a battery of three sides on the sea front, with the whole inclosed with ramparts, parapets, etc., mounting forty guns; *Castle Pinckney* was a brick work of elliptical form, with two tiers, mounting thirty guns; *Fort Mechanic (Mechonric),* on the point of the city, crossing its fire with that of the Castle at nine hundred yards, was a temporary masonry battery, falling into decay; in *Charleston* was a brick arsenal.

Beaufort, S. C.: Fort Marion, a work of tapia, circular of form in front and a straight line in rear, was begun in 1809 but was unfinished in 1811.

Savannah: Fort Green, on Cockspur Island, near the mouth of Savannah River, erected in 1794-1796, was an irregular work, with a battery. In 1804

the works were totally destroyed and a part of the garrison drowned in an unusually severe storm. *Fort Jackson,* at Five Fathom Hole, in a marsh on the west side of Savannah River, three miles below the town and twelve hundred yards from the nearest dry land, begun in 1808, was an inclosed work of masonry and mud, mounting six heavy guns.

St. Mary's (Point Petre): A battery of timbers, filled with earth and inclosed with pickets, was erected in 1799-1801 but was abandoned before 1804. Included in the 1807 project, no work had been accomplished because no site had been secured.

New Orleans: Fort St. Philip, at Plaquemines, on the eastern side of Mississippi River, thirty-two nautical miles from the mouth, an irregular work of brick built by Governor Carondelet in 1793, was acquired in 1803 in poor repair and rebuilt as an inclosed work of masonry and wood, mounting twenty guns. At *English Turn,* on the ruins of some French works, an inclosed work, with two bastions and a battery of masonry, for nine guns, was built in 1809-1811. When acquired in 1803, *New Orleans* was surrounded by five redoubts—Forts Burgundy, St. John, and St. Ferdinand in the rear, and Forts St. Louis and St. Charles in front, all dilapidated—connected by a line of ditches. *Fort St. Charles,* immediately below and at the northeast corner of the city, was restored as an inclosed redoubt of five sides, of masonry and earth, mounting nineteen guns. On the site of the Spanish *Fort St. John,* on Lake Ponchartrain, at the mouth of Bayou St. John, a strong battery of six guns, commanding the approach to New Orleans by way of the lake, was erected under the 1807 project.

The war with England brought about additional construction, and the acquisition of Florida in 1819 added to the ports and harbors to be defended. As a result the following new fortifications appear in the war and post-war years: Fort Lewis, New York; Craney Island, Virginia; Fort Scott, Point Petre, Georgia; Fort Marion San (Marco, or St. Mark's), Florida; Fort Barrancas, Florida; Fort Bowyer, Mobile Point; Pass Christian, and a number of lake and river forts.

In 1819, while a new coast project was in process of formation, the coast and inland forts were manned by the following garrisons:

Station	*Guns*	*Commanding Officer*	*Organization*	*Aggregate Strength*
Fort Sullivan, Maine	4	Lieut. Merchant		
Machias, Maine	4		Det., Corps of Arty.	39
Fort George, Maine	9	Capt. Leonard	1 Co., Lt. Arty.	70
Damariscotta, Maine	3			
Edgecomb, Maine	6			
Georgetown, Maine	6			
Fort Preble, Maine	14			
Fort Scammel, Maine	15	Bvt. Major Crane	1 Co., C. of Arty.	98
Old Fort Sumner, Maine	5			
Fort McClary, Maine	10	Bvt. Lt. Col. Walbach	2 Cos., C. of Arty.	195
Fort Constitution, N. H.	36			
Fort Pickering, Mass.	6			
Gloucester, Mass.	6			
Fort Sewall, Mass.	8	Bvt. Lt. Col. Harris	1 Co., Lt. Arty.	70

Fort Independence, Mass.	42	Bvt. Lt. Col. Eustis	5 Cos., Lt. Arty.	390
Fort Warren, Mass.	12			
Boston, Mass. (2 batteries)	14			
Plymouth, Mass.	5			
New Bedford, Mass.	6			
Fort Wolcott, R. I.	28	Bvt. Lt. Col. Towson	2 Cos., Lt. Arty.	146
Fort Adams, R. I.	17			
Fort Hamilton, R. I.				
Fort Green, R. I.	6			
Dumplins, R. I.	10			
Fort Griswold, Conn.	12	Capt. McDowell	1 Co., Lt. Arty.	53
Fort Trumbull, Conn.	18			
Fort Hale, Conn.	6			
Fort Columbus, New York	60	Lt. Col. House	Corps of Arty.	345
Castle William, New York	102			
Fort Lewis, New York				
Fort Wood, New York	24			
Fort Gibson, New York	14			
Castle Clinton, New York	28			
Humbert Battery, New York	16			
Fort Gansevoort, New York	12			
Sagg Harbor, New York	6			
Fort Mifflin, Pa.	37	Major Biddle	1 Co., C. of Arty.	121
Fort McHenry, Md.	30	Col. Hindman	1 Co., C. of Arty.	118
Fort Madison, Md.	13	Capt. Reed	1 Co., C. of Arty.	103
Fort Severn, Md.	6			
Fort Washington, Md.	19	Lt. Col. Jones	2 Cos., C. of Arty.	123
Fort Nelson, Va.	37	Lt. Col. McRea	Corps of Arty.	88
Fort Norfolk, Va.	30	Lieut. McIlvain	Corps of Arty.	50
Craney Island, Va.	20			
Fort Powhatan, Va.	13			
Fort Johnston, N. C.	9	Lieut. N. G. Wilkinson	Corps of Arty.	10
Fort Hampton, N. C.	5			
Fort Wingaw, S. C.	6			
Fort Johnson, S. C.	16	Lieut. Washington	Small det., C. of A.	
Castle Pinckney, S. C.	30			
Fort Mechonric, S. C.	7			
Fort Moultrie, S. C.	40			
Fort Marion, S. C.	6	Mil. Stork'p'r McCall		
Fort Jackson, Georgia	6			
Fernandina, Amelia Island		Capt. Payne	Corps of Arty.	222
Fort St. Mark's, Florida		Major Fanning	C. of A. and Inf'y.	108
Fort St. Charles de Barancas		Major Brook	C. of A. and Inf'y.	77
Fort Charlotte, Alabama			C. of A. and Inf'y.	46
Fort Bowyer, Alabama				
Fort St. Philip, La.	20	Major Humphreys	1 Co., C. of Arty.	85
Fort Petit Coquille, Lake Ponchartrain			1 Co., C. of Arty.	34
Bayou St. John, La.		Major Maney	1 Co., C. of Arty.	57
Fort St. Charles, La.				
Sackett's Harbor, New York		Col. Brady	Inf. and 1 Co., C. of A.	432
Greenbush, New York		Capt. Worth	Inf. and 1 Co., C. of A.	99
Fort Niagara, New York		Lt. Col. Pinkney	Inf. and Corps of Arty.	4
Detroit, Michigan Ter.		Major Marston	Inf. and 1 Co., C. of A.	169
Mackinow, Michigan Ter.		Capt. Pierce	1 Co., C. of A., and Inf.	131
Fort Scott, Georgia		Capt. Donoho	C. of Arty. and Inf.	75
Fort Gaines, Georgia			C. of Arty. and Inf.	13
Newport, Kentucky		Capt. L. Scott	1 Co., C. of Arty.	31

Military Situation of France's African Colonies

By 1ST. LIEUT. J. S. ROBINSON, C. A. C.

AFRICA, although it is the second largest of the continents, until recent years has been the least known. The main reasons for this condition are four: first, it is almost entirely within the tropical zone and much of the coast is extremely unhealthy for Europeans; second, it has a very regular coast line and but few good harbors or jumping off places to serve as bases for expeditions to the interior; third, the entire continent is a high plateau whose edges roughly parallel the coast at distances varying from a few miles to several hundred miles, thereby rendering nearly all African rivers valueless as useful routes to the interior; fourth, the northern section through which we would normally think penetration should come, has been held by peoples practicing a religion, militant Mohammedanism, hostile to our civilization, and in so far as the remainder of Africa is concerned could be considered an island shut off as it is by the Sahara, the Libyan, and the Nubian deserts.

Althought France has been interested in Africa since the Fourteenth Century, she has acquired her African empire since 1815. At the close of the Napoleonic Wars she held no colonies. Interest in Africa had been created by Napoleon's Egyptian campaign and furthermore it was about the only continent available for conquest. After the loss of Alsace Lorraine her interests were further intensified and these interests were encouraged and furthered by Germany until the latter began to acquire colonies of her own. At present she controls nearly half of Africa, an area of over 5,000,000 square miles, containing a population of more than 35,000,000.

These colonies are the islands of Reunion and Madagascar, French Somaliland, French Equatorial Africa, French West Africa, the Cameroons held under mandate, Algeria, and the protectorates of Tunis and Morocco.

As only about 5,000 of the 170,000 inhabitants of Reunion are not of French descent and it is governed as an integral part of France, it will not be considered in this discussion. Let us now consider the remaining colonies beginning with French Somaliland and continuing in a clockwise direction around the coast.

French Somaliland is a small colony about the size of Connecticut. It has a population estimated at from 50,000 to 200,000 who claim to be of Arabic descent. Its importance to France lies in the port of Jibuti, which is the only French coaling station on the East Coast and which is also the head of the only railway to Abyssinia, over which nearly all the trade of that country with the outside world is carried. This railway is owned by a French company. Although there have been several attempts to stir up the Somalis against the French, these have all failed. The reason for this is the French leave the

natives, except along the railroad, strictly alone and suffer no outside interference within the colony.

Madagascar is, after North and West Africa, France's most valuable colony. It is about as large as Texas. The coast is very regular and there are few good harbors. The interior is a high plateau cut up by mountains. A forest belt of from twenty to seventy miles in width, containing many valuable hardwoods, runs around all but the southwest section, which is very arid. There is considerable mineral wealth, principally gold, iron, and graphite. The climate of about one-seventh of the island is similar to that of the temperate zone and nearly the entire island is suitable for European colonization.

The population is about 3,500,000, of whom 20,000 are French. The native tribes, the principal one of which, the Hova, formerly ruled the island, are of Malaysian stock. There is but one language spoken. The French after their conquest of Madagascar left much political power to the Hova. They used this power to create an anti-French nationalist sentiment which culminated in 1916 in a plot to poison all the French on the island. The French therefore took away all political power from the Hova and started encouraging the other tribes. They have also recently started extensive secondary education, making school attendance compulsory between the ages of eight and fourteen. They are attempting through these schools and otherwise to create French sentiment. French colonization is encouraged but is very slow. Materially, the French have done much for the island. They have built carriage roads all over, a railway from Tananarivo, the capital, to Tamatave, its port, and public buildings and works over all the island. They have done much to improve agriculture, the principal industry of the island. All this has cost money and taxation has been disproportionately heavy. Madagascar like France is over officialled. A third cause of friction is religion, the Malagach religion being Protestant while that of official France either Catholic or non-existent. Although steps have been taken to improve conditions, there is still much discontent.

The value to France of Madagascar is: first, as a source of raw material; second, a source of man power in case of war; and third, as a colony suitable to French colonization. The Malagach was used during the war. They are very inferior soldiers and of small value as labor troops. The influence of the returning troops was bad. For defence of Madagascar, France depends on these Malagach troops, the fortified naval base of Diego-Suarez, and the intense dislike for foreigners of the native population.

French Equatorial Africa, comprising the four colonies of Gabun, Middle Congo, Ubangi-Shari, and Chad, is the least developed of France's colonies. The three southern colonies are dense tropical forest, the Chad savannes. Although these colonies have an area of nearly 1,000,000 square miles they have a population of less than 3,000,000, a decrease of over 1,000,000 in the past ten years, mainly due to sleeping sickness. A new port is being developed in the south from which a railroad is being built to Stanley Pool on the Congo, the principal trade route. The products of the southern colonies are timber, palm oil, rubber,

ivory, and cocoa. The Chad is a cattle raising country. It has no outlet for its produce and its development must await the trans-Saharan Railway. There is considerable copper in Babun, but the principal value to France of the colony is its timber. The big problem is the control of sleeping sickness.

The Cameroons, a former German colony, is held under French mandate. Its products and conditions are in the main similar to those of Equatorial Africa. The northern section of the Cameroons and much of Chad colony is suitable as to climate for white colonization.

French West Africa is about double the size of Mexico, and has a population of 12,500,000. It is bounded on the north by the 20° of latitude and on the south it encircles the British colonies of Gambia, Sierra Leone, the Gold Coast, and Nigeria, Portuguese Guinea, and Liberia. It should be noted that the English control almost the entire Gambia and Volta rivers and much of the Niger. They also control by far the best ports on the coast. They have leased the French two concessions on the Niger, one at its mouth, for commercial purposes. The climate and vegetation of the colony vary considerably. Most of the coast is low, unhealthy, and densely forested. The interior is the high African plateau cut up by mountains and rivers and bordering on the Sahara in the north. The native tribes, nearly all Mohammedan negroes, are grouped principally about the headwaters of the Senegal, Volta, and Niger rivers. The principal industry is agriculture; fruits, palm oil, ground nuts, rubber, cocoa, timber, and a little cotton are exported. There are but few good ports, the best one, Dakar, the capital, is being rapidly developed. Railway lines have been constructed.

This colony is of value to France for two reasons: first, manpower, and second, raw materials. The Senegalese are by far the best negro combat troop material in Africa. They have been fighting among themselves or against the Arabs and Berbers for over 1200 years. The French have no difficulty in maintaining of volunteer force of about 60,000. Upon the completion of railroad projects shown nearly 300,000 native will be available for service yearly.

North Africa, comprising Algeria and the protectorates of Tunis and Morocco, is France's most important colony. Physically these countries consist of a fertile strip of varying width along the coast, the high African plateau, the Atlas mountains, and the Sahara. The native population in each consists of Berbers, Arabs, and Jews. There are few negroes and almost no mixed negro bloods. The religion is Mohammedan. The principal industry of all three is agriculture. In all three colonies communications have been rapidly developed —first, roads for motor traffic, and secondly, railroads. Airplanes are used extensively for passenger, freight, and mail purposes, and in the desert for reconnaissance.

Algeria is divided into two sections; the northern section, nearly as large as Texas, has a total population of 6,000,000, one million of whom are Europeans; the southern section, nearly four times as large, has a population of 500,000, nearly all Berbers or Arabs. The northern section, although it has representation in the French Parliament is governed by a governor and council under

the French Minister of the Interior. The southern section is divided into military districts. The principal crops are wheat, barley, oats, wine, and olives. It has very valuable forests and considerable mineral wealth, principally iron and zinc. It is also a great sheep-raising country, an average of 800,000 sheep having been shipped annually to France during the war.

Tunis is a protectorate governed by a Bey, assisted by a French resident general. It has a total population of nearly 2,000,000, including 200,000 Europeans, mostly Italians, who by treaty have a preferential status and are able to keep their Italian citizenship. The principal crops are cereals, olives, and dates. Phosphates, iron, zinc, and lead are exported.

Morocco accepted a French Protectorate in 1912, for which privilege France paid Germany with two sections of Equatorial Africa which she has since recovered. Treaties and agreements with Spain, approved by the other powers, divided the country into three sections, a Spanish protectorate, the Tangier international zone, and a French zone about as big as France, with a population of over 4,000,000. The country is ruled by a sultan who is advised by a resident general. The government of Tangier has not yet finally been decided upon although France and Spain only recently came to an agreement which has yet to be ratified by England and Italy. Tangier belongs more to French than to Spanish Morocco, and only the jealousy of England prevented her from getting it. Its present status is not satisfactory and it must eventually be taken over by either Spain or France. French Morocco is very mountainous, being crossed by five ranges of the Atlas mountains. The valleys between these mountains and the plains near the coast are very fertile. The principal exports are farm products, eggs, poultry, and cereals. Copper, lead, tin, and oil are known to exist. In Marshal Lyautey, the resident general from 1912 until 1926, the French have had one of the greatest colonial administrators of all time. Entering the World War with much of Morocco in revolt he succeeded by a system of political and military penetration in pacifying nearly the whole country, and while doing so actually released a large part of the French garrison and in addition sent over 70,000 Moroccan troops for service in France. During his administration over 900 miles of railroad and 1500 miles of roads suitable for motor traffic have been built. Contrast this to Tripoli acquired by Italy in 1912. In 1918 the Italians held two coastal towns and the Germans had a submarine base on the coast.

There have however been constant rebellions in Morocco and it is yet not completely pacified. Its people are very warlike and have always been more or less independent. The most serious rebellion—that of Abd-el-Krim—started in the Spanish zone in 1923. In 1925 Abd-el-Krim, relying on his communist friends in Paris whom he apparently believed could prevent action being taken against him, attacked the French. Early in 1926 he was finally defeated after a very hard fought and costly campaign. After his surrender a large number of his followers immigrated to French Morocco to get out of the Spanish zone. The conduct of his army, at no time consisting of more than

6000 troops, gives an indication of the worth of Berber troops to France in future wars.

In all three of these countries European immigration, especially French, is encouraged. Secondary education is promoted, as is the higher education of a very limited number of natives for civil positions. The French consider that higher education of more than those for whom positions are available is a mistake and a cause of discontent, in which connection they point out Egypt. In Algeria the French adopted the French legal code. In Tunis they adopted a combination of the French and Mohammedan codes. In Morocco the French code is for the French, the Mohammedan for the Mohammedans. This is by far the most satisfactory. In these three countries there is no color line; all are equal before the law. Marshal Lyautey summed up the situation when he said: "We do not regard these people as an inferior race but as a different race than ourselves." These three colonies constitute the home station of the XIX Army Corps, the regiments of which are composed of battalions of French and battalions of natives. This service has done much to promote good relations. It is the object of France to absorb these three countries into a greater France by means of education and common interests and through contact with a leaven of native French citizens.

The present value to France of these colonies is, first, manpower and, second, raw material and food. During the past war they furnished 260,000 combat and 140,000 labor troops. Their combined population is 12,400,000, approximately, which indicates that they should furnish about 1,200,000 available manpower for military purposes.

The general problems confronting France in Africa are: the control of the smuggling of arms, the liquor question, the control of tropical disease, the training of African troops, the exploitation of undeveloped portions of the country through improved communications, the adjustment of the status of Tangier to the satisfaction of Spain, England, and Italy, and the adjustment of Italian aspirations in Tripoli and Somali.

Arms can be legally imported only into Algeria. The presence of the Spanish and Portuguese colonies adjacent to North and West Africa, in which treaties relative to smuggling are not rigorously carried out, makes this a very difficult and continuous problem. Liquor has nearly as bad an effect on Africans as have firearms and although importation is restricted there is extensive smuggling which is very difficult to control. Sleeping sickness and other diseases have made great inroads in the native population, especially in the Congo. At present in nearly all the colonies there is a special medical budget. The French have realized, along with the English, that the wealth of Africa, especially tropical Africa, depends on the welfare of the native.

The training of African troops has long been a subject of dispute. The present French budget provides for the training of only about 200,000 Colonials, including Indo-Chinese, per year, and more funds are not available. Military training in mandated territories is prohibited. The majority of European

nations are opposed to use of African troops as it is against their interests. As it is in France's interest to use them she most certainly will.

Great steps are being taken all over French Africa in developing communications. Railroads and roads are being built. Special types of tractors and six-wheel cars are being extensively experimented with for use in the Sahara. Special types of small boats with engines using charcoal for fuel are coming into use on the rivers. Airplanes are being used extensively, especially in North Africa and in the Sahara.

Spain is not satisfied with her share of Morocco. She desires control of Tangier. Italy is dissatisfied with her African requirements awarded her after the war. She claimed a large section of French West and Equatorial Africa as far south as Lake Chad, and French Somaliland. She received a slight adjustment of the western Tripolitan border from France. She likewise believes she should have special rights, if not exclusive rights, in Tunis. It is very doubtful whether France will ever cede either any more territory, as by so doing she increases the probability of revolts which are liable to spread into her own territory, in addition to which neither Spain nor Italy have anything of value to give her in exchange.

FRENCH COLONIAL POSSESSIONS IN AFRICA

	Capital	*Sq. Miles*	*Population*
Reunion		970	172,190
Madagascar	Tanarive	228,710	3,471.010
French Equitorial Africa	Brazzaville	(982,050)	(2,845,930)
Gabun		121,860	388,780
Middle Congo	Brazzaville	150,290	581,140
Ubangi-Shari		208,220	604,640
Chad		501,680	1,271,370
French West Africa	Dakar	(1,883,960)	(12,640,700)
Senegal	Dakar	74,110	1,225,520
Guinea		95,220	2,028,320
Ivory Coast		121,980	1,545,680
Dahomey		42,460	842,240
French Soudan		648,480	2,474,590
Upper Volta		154,400	3,018,190
Mauritania		345,400	284,400
Territory of Niger		404,910	1,221,760
[1]Cameroon	Yaounde	166,490	1,500,000
Algeria	Algiers	(1,071,180)	(5,802,460)
Northern Territory		222,180	5,256,420
Saharan Territory		849,000	546,040
[2]Tunis	Tunis	50,000	2,093,940
[2]French Morocco	Rabat	213,000	5,400,000
Comoros		790	110,000
French Somaliland	Jibuti	5,790	208,000
[2]French Togoland		21,890	672,840
Sahara		695,000	254,000
Total in Africa		5,319,830	35,171,070

[1]Mandate. [2]Protectorate. [3]Attached to Dahomey.

PROFESSIONAL NOTES

Coat of Arms for the Harbor Defenses of Los Angeles

Shield: Parti per fess wavy *gules* and *azure,* in chief two angels habited of the second and *argent* and winged *or* proper and in base two keys in saltire of the fourth and third.

Crest: On a wreath of the colors (*or* and *gules*) a crescent *gules.*

Motto: Nosotros Los Defenderemos.

The escutcheon combines San Pedro (Los Angeles Harbor) and the City of Los Angeles, both of which are defended by the guns of Fort MacArthur, and is an excellent example of "canting" heraldry, Los Angeles being represented by the two angels and of symbolic heraldry, San Pedro being represented by the keys of St. Peter.

Los Angeles Harbor or San Pedro Harbor is in the lee of Point Fermin, which was a point of note with the early explorers. Cabrillo in 1542 named it "Bahia de los Humos," and it appears on the charts of Vizcanio, 1603, under the name of "Ensenada De San Andres." In 1734 the Spanish Admiral Gonzeles gave it the name of San Pedro, which name continues in use today. It was a regular loading and unloading place for vessels from the date of the founding of the Pueblo of Los Angeles in 1781. The motto refers to both the port and the city: "We shall defend them." On account of the Spanish origin of the community in which the Harbor Defenses are situated, the motto, "Nosotros los defenderemos," is in Spanish.

The crest pertains to the first organization to garrison these Harbor Defenses in 1917, the present 38th Company, Coast Artillery Corps, known in 1812 and the years following as Capt. S. B. Archer's Company.

Captain Archer was notified by letter from The Adjutant General, March 30, 1815, to report to the Secretary of Navy to receive instructions relative to the future service of his company of artillery. Under these instructions he proceeded to New York and reported his company to Commadore Stephen Decatur for service with his squadron then being fitted out for service against the Regency of Algiers.

On May 30, 1815, the squadron, consisting of the 44-gun frigate *Guerrière,* 38-gun frigate *Macedonian,* 36-gun frigate *Constellation,* and 7 smaller vessels, set sail from New York for the Mediterranean.

Captain Archer's Company of Artillery was split up in detachments for service on different vessels, of the squadron. Forty-six officers and men served on the U. S. S. *Guerrière,* the flagship of Commodore Decatur.

June 16, 1815, when in the Mediterranean off the Cape de Gat, the squadron fell in with and captured an Algerian frigate of 46 guns and between four and five hundred men, commanded by an Algerian admiral. She struck after a running fight of twenty-five minutes and after receiving two broadsides from the *Guerrière* which killed the admiral and about thirty of the crew. The prize was sent to Carthagena.

Continuing on, the squadron, on June 19, fell in with and captured off Cape Polos an Algerian brig of 22 guns and 180 men after a chase of three hours. After putting the greater part of the prisoners on board the captured brig she was also sent to Carthagena. The squadron then made sail for Algiers where it arrived on June 28. Here, under the threat of the guns of the squadron, the Bey of Algiers signed a treaty putting an end to the payment of tribute by American shipping.

From Algiers the squadron proceeded to Tunis and Tripoli where difficulties of a minor nature were adjusted, after which the squadron sailed for home arriving in New York in November, 1815.

Here the company was reorganized and outfitted in preparation to being transferred to Fort Bowyer (Mobile Point).

Scoring for Harbor-Defense Artillery

The following score has been adopted for seacoast guns and mortar batteries.

a. A Component—hitting (record fire).

(1) *For guns.*

$$A = \left\{ \frac{H'}{P'S} + \frac{H''}{P''S} \right\} \times 12.5$$

(2) *For mortars.*

$$A = \left\{ \frac{H'_1}{P'_1S_1} + \frac{H''_1}{P''_1S_1} \right\} \times 6.25 + \left\{ \frac{H'_2}{P'_2S_2} + \frac{H''_2}{P''_2S_2} \right\} \times 6.25$$

In this component—

S = Number of record shots.
H′ = Number of hits record shots, target parallel with towing vessel.
P′ = Probability of hitting, target parallel to towing vessel.
H″ = Number of record shots, target bow on.
P″ = Probability of hitting, target bow on.
Subscript 1 refers to one zone.
Subscript 2 refers to other zone.

b. B component—accuracy (record fire).

(1) *For guns.*

$$B = \frac{M + N}{2d} \times 40.$$

(2) *For mortars.*

$$B = \left\{ \frac{M_1 + N_1}{2d_1} \right\} \times \left\{ \frac{S_1}{S_1 + S_2} \right\} \times 40 + \left\{ \frac{M_2 + N_2}{2d_2} \right\} \times \left\{ \frac{S_2}{S_1 + S_2} \right\} \times 40.$$

In this component—

$$M = \frac{\text{P. E.}}{0.845}$$

$$N = \frac{\text{DPAE range (stripped of wild shots)}}{0.845}$$

d = Mean of actual range deviations of record fire.
S = Number of record shots.
Subscript 1 refers to one zone.
Subscript 2 refers to other zone.

c. C component—time (record fire).

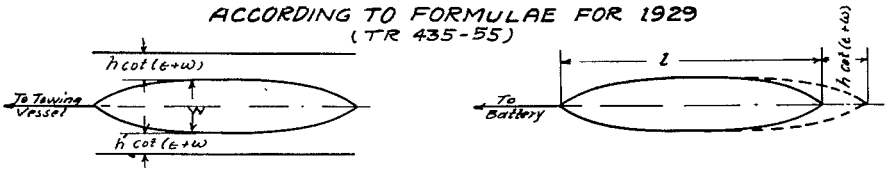
$$C = \frac{KS}{gt} \times 35$$

In this component—

K = Number of seconds prescribed as normal time for firing one shot per gun.
S = Number of record shots fired.
g = Number of guns firing.
t = Corrected time of practice in seconds.

d. D component—penalties (record fire).

SAMPLE OF SCORING
FOR
GUNS
ACCORDING TO FORMULAE FOR 1929
(TR 435-55)



Battery & Regiment	Sample			
Name & caliber of battery firing	Dodd, 12" B.C			
Date	Jan 2, 1929			
Mean Corrected range	11287			
D A P E (Range)	32			
D A P E (Direction)	9.5			
P E. (Table I, TR 435-55)	65.6			
S = Record shots	8			
H' = Hits, Broad-side	3			
H'' = Hits, Bow-on	6			
Height of site (Yds)	2			
ε = Angle of site	01			
ω = Angle of fall	10° 00			
h = Height of target above water (Yds)	10			
h' = Height of target below water (Yds)	4			
l = Length of target (Yds.)	200			
w = Width of target (Yds.)	33.33			
h cot (ε+ω)	56.60			
h' cot (ε+ω)	22.64			

$$A = \left[\frac{H'}{5P'} + \frac{H''}{5P''}\right] 12.5$$

HEADED IN DIRECTION OF TOWING VESSEL				
D S (Danger space) = w + (h+H) cot (ε+ω)	112.57			
Factor = ½ D.S. ÷ D A P E. (Range)	1.759			
P' = Probability	.7645			
5P'	6.12			
H' ÷ 5P'	0.49			
HEADED IN DIRECTION OF FIRING BATTERY				
D S (Danger space) = l + h cot (ε+ω)	2566			
Factor (Range) = ½ D.S. ÷ D.A.P.E. (Range)	4.009			
P_R'' = Probability (Range)	.9930			
D.S = w (Direction)	33.33			
Factor = ½ D S ÷ D A P E. (Direction)	1.754			
P_D'' = Probability (Direction)	.7632			
$P_R'' \times P_D'' = P''$	.7579			
5P''	6.063			
H'' ÷ 5P''	0.99			
H' ÷ 5P' + H'' ÷ 5P''	1.48			
A = (H' ÷ 5P' + H'' ÷ 5P'') 12.5	18.5			

$$B = \frac{M+N}{2d} \times 40$$

M = PE ÷ 0.845 (Line 7)	77.6			
N = D A.P.E ÷ 0.845 (Line 6)	37.9			
M+N	115.5			
d = Mean of actual deviations	78.1			
(M+N) ÷ 2d	0.74			
B = [(M+N) ÷ 2d] 40	29.6			

$$C = \frac{KS}{qt} \times 35$$

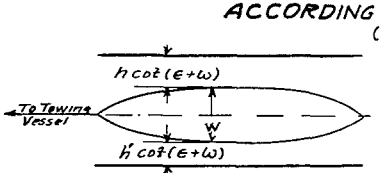
K = Normal time per Shot per gun	45			
S = Number of record shots	8			
q = Number of guns	2			
t = Corrected time of practice in seconds	305			
KS	360			
qt	610			
KS ÷ qt	0.59			
C = (KS ÷ qt) 35	20.7			

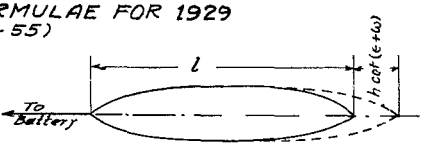
Score = A + B + C - D	Actual	Allowed*	Actual	Allowed	Actual	Allowed
A	18.5	18.5				
B	29.6	29.6				
C	20.7	20.7				
A+B+C	68.8	68.8				
D	9.9	9.9				
SCORE	58.9	58.9				

*NOTE If the time per shot exceeds "K" the maximum allowable score for the "A" component is 25; for the "B" component, 40. If the battery is not adjusted at the end of practice, the maximum allowable score for the "C" component is 35.

Coast Artillery Board
Fort Monroe, Va.
Dec 7, 1928

SAMPLE OF SCORING
FOR
MORTARS
ACCORDING TO FORMULAE FOR 1929
(TR 435-55)





Battery & Regiment	Sample					
Name of Battery Firing	Doe					
Date	Jan 2, 1929					
Zone	VI	VII				
Mean corrected range	6674	7563				
D.A.P.E (Range)	465	448				
D.A.P.E (Direction)	12	17				
P.E (Table I, TR 435-55)	47	51				
S = Record shots	8	7				
H' = Hits, Broad-side	3	1				
H'' = Hits, Bow-on	2	1				
Height of site (Yds.)	58	58				
ε = Angle of site	30'	26'				
ω = Angle of fall	59° 59'	65° 32'				
h = Height of target above water (Yds.)	10	10				
h' = Height of target below water (Yds.)	4	4				
l = Length of target (Yds.)	200	200				
W = Width of target (Yds.)	33.33	33.33				
h cot (ε+ω)	5.66	4.56				
h' cot (ε+ω)	2.26	1.82				

$$A = \left[\frac{H'_1}{S_1 P'_1} + \frac{H''_1}{S_1 P''_1}\right] 6.25 + \left[\frac{H'_2}{S_2 P'_2} + \frac{H''_2}{S_2 P''_2}\right] 6.25$$

HEADED IN DIRECTION OF TOWING VESSEL.						
D.S. (Danger Space) = W + (h+h') cot (ε+ω)	41.3	39.7				
Factor = ½ D.S. ÷ D.A.P.E. (Range)	.444	.443				
P' = Probability	.2354	.2349				
SP'	1.88	1.64				
H' ÷ SP'	1.59	0.61				
HEADED IN DIRECTION OF FIRING BATTERY:						
D.S. (Danger space) = l + h cot (ε+ω)	205.7	204.5				
Factor (Range) = ½ D.S ÷ D.A.P.E (Range)	221	228				
P'_2 = Probability (Range).	.8643	.8762				
D.S. = W (Direction)	33.33	33.33				
Factor = ½ D.S. ÷ D.A.P.E. (Direction)	1.389	0.980				
P''_2 = Probability (Direction)	.6512	.4913				
$P'_2 \times P''_2 = P''$	.563	.431				
SP''	4.50	3.01				
H'' ÷ SP''	0.44	0.33				
H' ÷ SP' + H'' ÷ SP''	2.03	0.94				
(H' ÷ SP' + H'' ÷ SP'') 6.25	12.7	5.9				
A = Sum of both zones	18.6					

$$B = \left[\frac{M_1 + N_1}{2d_1} \times \frac{S_1}{S_1 + S_2}\right] 40 + \left[\frac{M_2 + N_2}{2d_2} \times \frac{S_2}{S_1 + S_2}\right] 40$$

M = P.E ÷ 0.845 (Line 8)	55.6	60.4				
N = D.A.P.E ÷ 0.845 (Line 6)	55.0	53.0				
M + N	110.6	113.4				
d = Mean of actual deviations	47.0	120.0				
(M+N) ÷ 2d	1.18	0.47				
S ÷ (S₁+S₂)	.53	0.47				
[(M+N) ÷ 2d] [S ÷ (S₁+S₂)]	0.63	0.22				
[(M+N) ÷ 2d] [S ÷ (S₁+S₂)] 40	25.2	8.8				
B = Sum of both zones	34.0					

$$C = \frac{KS}{gt} \times 35$$

K = Normal time per shot per gun	50					
S = Number of record shots.	15					
g = Number of guns	2					
t = Corrected time of practice in seconds	525					
KS	750					
gt	1050					
KS ÷ gt	.714					
C = (KS ÷ gt) 35	25.0					

Score = A + B + C − D	Actual	Allowed*	Actual	Allowed	Actual	Allowed
A	18.6	18.6				
B	34.0	34.0				
C	25.0	25.0				
A+B+C	77.6	77.6				
D	3.5	3.5				
SCORE	74.1	74.1				

*NOTE: If the time per shot exceeds "K," the maximum allowable score for the "A" component is 25; for the "B" component, 40. If the battery is not adjusted at end of practice, the maximum allowable score for the "C" component is 35

Coast Artillery Board
Fort Monroe, Va
Dec 7, 1928

For each combined range-section and gun-section personnel error in range, for each combined range-section and gun-section personnel error in direction, for each wild shot, for each spotting error erroneously sensed, for each splash lost by the spotting section, for each adjustment or ballistic correction ordered applied in the wrong direction, and for failure to man the proper number of guns, certain penalties are applied.

As we go to press, we are in receipt of TR 435-55, Coast Artillery Target Practice, and find that certain of the values employed in working out the examples herewith have been changed, but the changes do not affect the methods of computation illustrated.

An Observers' School at Fort Mills

By MAJOR C. D. Y. OSTROM, C. A. C.

A School for Observers in the Harbor Defenses of Manila and Subic Bays was held at Fort Mills, P. I., during the period of July 1 to September 30, 1928. All men who were to act as observers for fire against naval targets during the coming target practice season were required to attend and no soldier was to be permitted to act in this capacity unless he satisfactorily completed the course in the school. In order to continue the instruction of these men along approved lines, a school for officers was instituted at which one officer from each firing battery was in attendance.

Instruction was given about one hundred and thirty men, both American and Filipino, whose training and experience varied from that of the well-trained, experienced observer to that of the man with no training along these lines. Training was restricted to practical instruction on the use of the instruments. The general scheme of instruction was to demonstrate and explain the proper method of performing a certain operation with an instrument, after which the men were given ample opportunity for practice in this operation under supervision of one of the instructors and were then tested in this one operation. Examples of these operations were: Leveling, adjusting level bubbles, parallax removal, orienting and adjustment for range using both the waterline and an artificial waterline. Upon completion of the separate tests a man was given a general test of all operations, including tracking.

Instruction was given first on the azimuth instrument, then on the depression position finder and the coincidence range finder. All men were given the complete course on the first two instruments and brief instruction on the last named with the exception that more intense instruction was given certain observers from batteries using coincidence range finders in their normal systems of position finding.

For training on the azimuth instrument, all men were consolidated into one group, being later divided into a Topside group and a Middleside group for test purposes.

For the depression position-finder training, the men of each battery reported for instruction at their battery observing station. This made it impossible for the officers to give all the instruction. Instruction was first given the most experienced observers of the battery and he in turn acted as instructor for the men in his battery. Two "test stations" were selected, at each of which one of the officers was stationed testing the men in the various operations as they reported by roster and at the same time giving such additional instruction to individuals as was required. The other officers went from station to station, supervising, questioning, and instructing during this period.

All men were given brief instruction on the coincidence range finder, while the observers of those batteries whose position-finding system contemplated the use of one of these were given more extended instruction and practice on the training instrument as well as on the coincidence range finder itself.

The final work consisted of a tracking test for each man on each type of instrument with a boat at such ranges as should be expected for practice.

Instruction given the officers' school was confined to the depression position finder. Its proper use is most important in these defenses. After instruction, each officer was required to perform the various operations laid down for the adjustment and use of this instrument.

Modified Gray Spotting Board

By CAPTAIN K. S. MACKIRDY, 41ST C. A.

Figures 1 and 2 are illustrations of a modified Gray spotting board which has been used by Battery A, 41st Coast Artillery, in five practices during the past two years. The

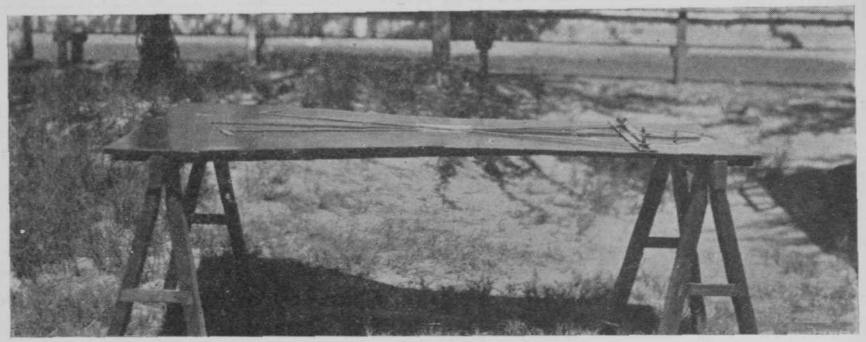


FIG. 1

board can be made to any convenient scale, but the board in the illustrations was made to a scale of four inches equal to one thousand yards, and for use by a mortar battery the

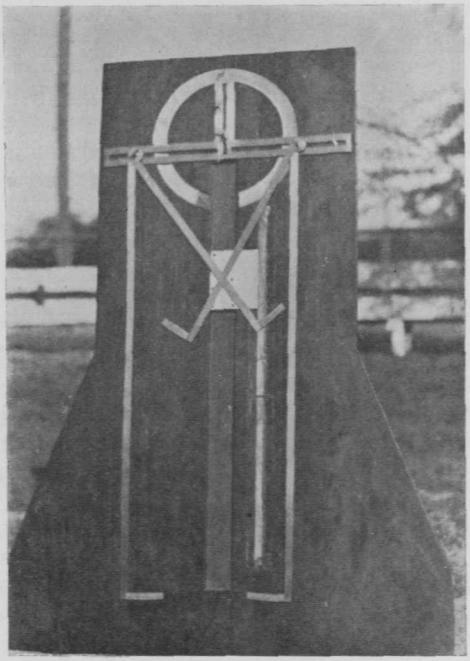


FIG. 2

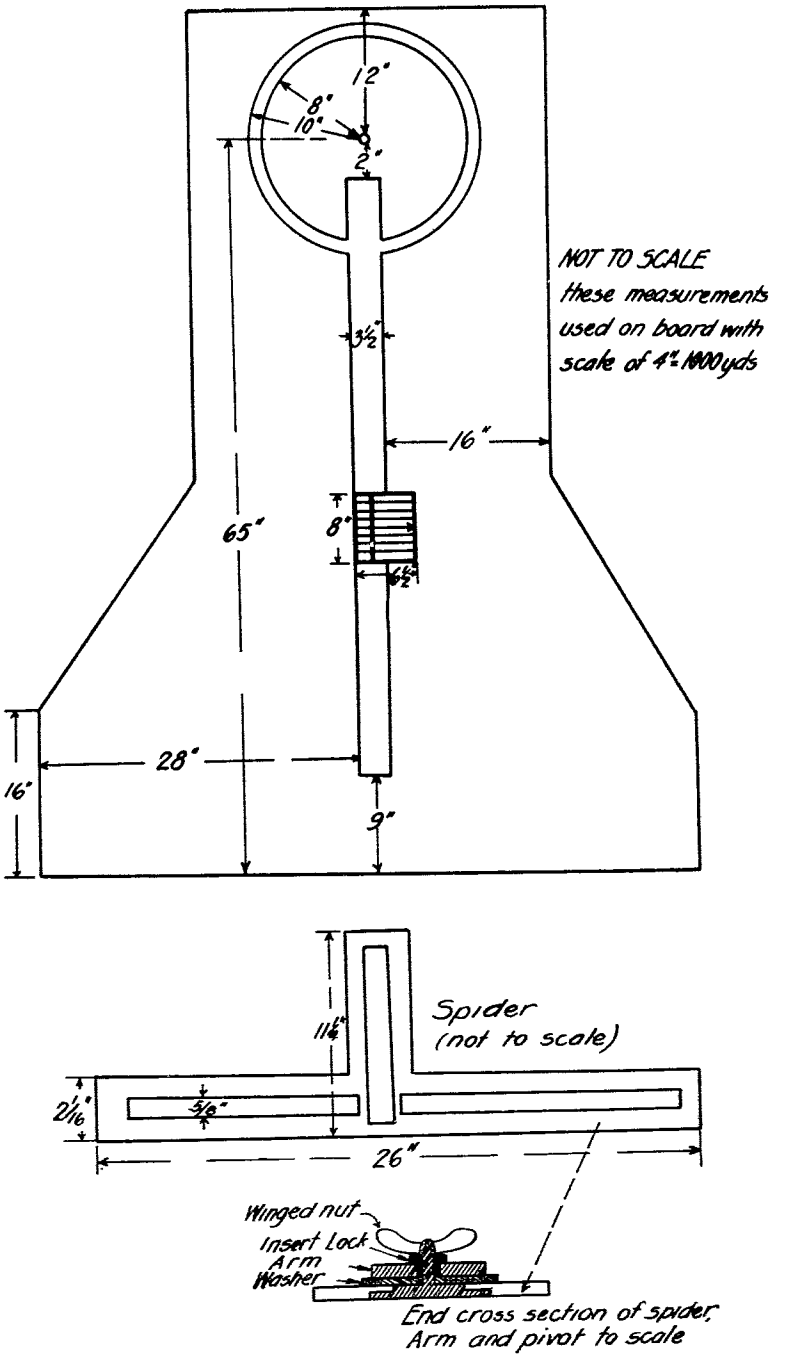

12"
8"
10"
2"
3½"
16"
65"
8"
6½"
28"
16"
9"
NOT TO SCALE
these measurements
used on board with
scale of 4" = 1000 yds
Spider
(not to scale)
1¼"
2 1/16"
5/8"
26"
Winged nut
Insert Lock
Arm
Washer
End cross section of spider,
Arm and pivot to scale

FIG. 8

scale was about right. As shown, there are two sets of arms: One set for subcaliber, one set for service.

This board in general follows the scheme laid down in T. R. 435-221, paragraph 42, except that metal arms are used in place of the strings and an adjustable spider is used in lieu of the board. By use of the metal spider the board is made universal and therefore may be used for any battery or set-up, provided the scale is of proper size. The pivots around which the arms swing are so made that they can be slid in the slot shown and then locked so that the rotation of the arms around their pivot do not loosen. The directing point is the center of the board, but since the spider is allowed to slide backwards and forwards when the winged screw is unloosened the set-up can be adjusted for the directing point in front of or behind the baseline.

On the ends of the arms are five-inch acrs, one inch in width, the center of which is normal, or three, to correspond with the scale in the azimuth instrument, one and two being on the right and four and five on the left as you face the center of the board. This arrangement permits of the most rapid working of the board, for once the block in the center is slid to the range and the arms crossed at the center line a pin is stuck in the board at the normal of each arc. The spotter sends in his reading as taken from the azimuth instrument scale and the arm quickly moved to the same reading against the pin. When both arms are set we read off the overs and shorts directly on the board, using colored inks to differentiate between them.

For the arms and the spider we used one-eight inch brass and for the board old flooring drêssed down on the top. The legs were made from projectile crates thrown out on the salvage pile. The legs are saw horses which fit into joices on the under side of the board.

The azimuth circle is inlaid, into which a piece of linenback paper just fits to hold it tight. This must be changed for every considerable change of azimuth of the baseline. A point aids in setting the spider and can be seen on the face of same in upper part of picture pointing to the circle.

The sliding range block is made lopsided to allow of crossing the arms without covering the range scale. The center line has a pointer traveling against the range scale.

This board was found to be very fast, and with a little practice can be operated so that the results can be placed on a blackboard beside the spotting operator about the time one observer gets his report back in.

One drawback to the board is the fact that two observers, two armsetters, and a plotter are needed to operate the board. The board gives accurate and fast spotting at the expense of personnel.

This is submitted in the hope that it may be of some assistance to some battery in need of good spotting.

Fort Wood and the Statue of Liberty

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Fort Wood is situated on Bedloe's Island, New York Harbor, and its site was named after Isaac Bedloe. In 1667 Governor Nicolls referred to Bedloe's Island as the "largest of our Oyster Islands." Governor Lovelace in 1669 issued a commission for Isaac Bedloo [Bedloe] and a year later conferred special privileges upon Love Island, which later became known as Bedloe's Island and is so called today.

On August 10, 1670, Lovelace gave the new name of "Love Island" to a "Certaine Little Island in ye Bay neare this Citty comonly called Oyster Island" for which Bedloe had had a patent granted by Col. Richard Nicolls and the Island was made a "Privileged place where no Warrant of Attachmt or arrest shall be made of force or served unless it be by ye Governors Speciall Warrant in Cases of breach of ye peace or Cryminall Mattrs."

The island was originally one of the possessions of the Colonial Government of New Amsterdam and during the Revolutionary War called Kennedy's Island after Captain Kennedy, commander of the British Naval Station of New York who purchased it from the trustees of Mary Smith, a daughter of Bedloe, for 100 pounds. In 1750 it was sold to New York for a pest house site and in 1800 the state gave the island to the Federal Government. The present star-shaped fort was constructed in 1841 at a cost of $21,300. Guns were mounted on the parapet and a garrison of approximately 350 men was stationed on the Island.

In recent years the United States Army Signal Corps has maintained a laboratory at the fort but this was abandoned on December 1, 1922, and at present Fort Wood is garrisoned by "B" Company, 16th Infantry.

The real history of Bedloe's Island began about 1877 when it was designated to be the site of the Statue of Liberty.

Soon after the Franco-German War, during which the Americans had given many substantial proofs of sympathy to France, a party of men eminent in letters and politics, among whom were Laboulaye, Lafayette, Jules de Lasteyrie, Paul de Remusat, Waddington, Victor Borie, Leduc and Bartholdi, conceived the idea to unite, at the approaching one hundredth anniversary of the Independence of the United States, with their political friends in America in a joint demonstration.

It was proposed to present the people of America at the celebration of the great event with a token of friendship in the shape of an exceptional monument glorifying the union between the countries. The plan was adopted, and Frederick August Bartholdi, a young French sculptor, who had already given proof of exceptional talent, was sent to America to confer with prominent patriots and admirers of the French about the project. On his entering New York Harbor he was so deeply impressed with its natural beauty and grandeur that he conceived the idea of raising a statue symbolizing "Liberty Enlightening the World" on one of the islands in the beautiful bay. At night a resplendent aureole upon its brow should throw out upon the sea beams of light, greeting the newcomer and reminding him that he comes to the "Land of the Free." Bartholdi proposed a plan for the monument which was accepted.

On the recommendation of President Hayes, a joint resolution was passed by Congress on February 22, 1877, authorizing the President to set apart a site for the statue on Bedloe's Island and to provide for its maintenance and to except the statue when presented by the French people.

A committee was formed in 1874 to raise funds for the construction of the statue. The Monument of Independence, as it was called, was to be executed by two peoples, the French furnishing the statue and the Americans the pedestal. One hundred and eighty cities, forty general councils, many societies, and thousands of people contributed to the statue. The New York *World* used its vast influence and circulation, and by a stirring appeal succeeded in raising $100,000 for the pedestal fund.

The total cost of the statue and pedestal was about $1,000,000.

The head of the statue was completed for the Paris Exposition in 1878, and the following year all necessary funds were obtained for the statue.

The forearm was completed and sent to America and shown at the Centennial Exposition in Philadelphia in 1876. From there it was sent to New York and reposed in Madison Square until 1886, when it was taken to Bedloe's Island.

On October 24, 1881, the anniversary of the Battle of Yorktown, all the pieces of the framework and base were put in place in Paris. Levi P. Morton, U. S. Minister to France, drove the first rivet of the first piece which was to be mounted. The statue was completed in 1883. On July 4, 1884, M. deLesseps, President of the French Committee, officially presented the statue to Minister Morton.

In the latter part of June, 1885, the French vessel *Isere* from Rouen, France, having aboard the statue in 210 cases, sailed into New York Harbor accompanied by the North Atlantic Squadron.

The cornerstone of the pedestal was laid on August 5, 1884. The work of putting the statue together was commenced in May, 1886, and completed in October of the same year.

Invitations were sent out on the occasion of the unveiling of the Statue of Liberty by the President of the United States, on October 28, 1886, signed by John Schofield, Major General, U. S. Army, Commanding Division of the Atlantic.

An Object Lesson

It is as impossible for a nation to acquire absolute immunity from all war, as it is for an individual to acquire absolute immunity from all disease. The best a nation can do is to build up its power of resistance in a way that will discourage attack and minimize the danger from any assault that may be attempted by another power. In trying to do that, it ought to take to heart the fact that the individual who undertakes to ward off disease does so by keeping himself in a state of robust health and developing his fighting powers both actual and potential. He doesn't go out looking for trouble. He lives a sane, sensible and as far as possible peaceful life, avoiding contact with hostile germs, but he keeps himself fit and ready for trouble if it comes his way. And in case he does get into a row with a bug or two, the odds are that he will win out handily in the engagement that ensues.—*Detroit Free Press.*

For Fast-Moving, Hard-Hitting Armies

A board of army experts, appointed last spring to make a special study of modern military equipment and of its uses in future warfare, in its report to Secretary Davis urges the formation of a highly motorized and mobile striking force, to consist of light and speedy tanks of a new type, armored cars, powerful tractor-drawn trucks, automobile artillery, and, last but not least, infantry on wheels.

The suggestion originated in experiments carried out under the board's auspices, and it envisages a force in which properly coordinated elements of the various land fighting services could keep pace and cooperate with the fast-moving tanks. Other nations, among them the British and the French, have recently made similar tests, with the difference that in some of them, cavalry and aviation also were brought into play.

Studies of this kind are particularly significant in our day. The question of maximum mobility and striking power is likely to be of paramount importance on the battlefields of the future. For that matter, this has always been true of warfare. A complex aggregation of qualities went to make up the military genius of Napoleon, but perhaps none of them contributed more to the winning of his victories than this ability to get the utmost speed and offensive out of the fighting equipment at his disposal. He was usually a jump or two ahead of his enemies, and then he hit them hard.

Since Napoleon's day a vast series of changes has occurred in military equipment, and while the infantry still marches on foot and cavalry still moves on horseback, the fleet flying machine, the tank and motor transport make it necessary to devise entirely new modes of collaboration among the diverse units of an army in action. It is still the rule, as it was in Napoleon's time, that victory goes to the faster-moving and the harder-hitting army.—*Detroit Free Press.*

War Cure

The problem of putting an end to war is the most puzzling and difficult one before the nations, and the one whose solution would bring the greatest amount of blessing to mankind if actually solved. There is, however, much reason to fear that it can be solved only

through an alteration of some of the fundamental characteristics of human nature, and that until such an alteration can be achieved, the best civilization can do will be to try to make wars as few and as far between as possible, and minimize their horrors as much as may be practical.—*Detroit Free Press.*

A Misplaced "But"

In one of the accounts of the life of Marshal Cadorna it was written "he had the record of being a strict disciplinarian, but impartial." There never was a "but" more out of place. Any old soldier, whether from the ranks or not, could tell the writer of that sentence that the very essence of discipline is impartiality. Imitations of discipline may be produced by commanders who play favorites, but they will not stand much inspection or a severe test. —*New York Sun.*

Emergency Officers' Retirement Act

Brigadier General Frank T. Hines, Director of the U. S. Veterans Bureau, has announced that 7,576 claims for retirement under the Emergency Officers' Retirement Act have been received by the U. S. Veterans' Bureau of which number 1213 have been settled, retiring with pay 708 officers, retiring without pay 40 and disallowing claims in 465 cases.

The Director pointed out that there appears to be a misconception on the part of some of those interested in the administration of the law, with respect to those officers actually entitled to retirement within the purview of the statute. This, it was explained, is due in a large measure to the fact that a list of all former officers then rated by the Bureau as 30% permanently disabled irrespective of the provisions of the law under which their disabilities were connected with service, was printed in the Congressional Record previous to the passage of the Act, and it was assumed by many that the list represented the actual potential beneficiaries. However, the Emergency Officers' Retirement Act as passed by Congress limited its benefits to those officers having a disability resulting directly from service and incurred in line of duty, leaving without its scope those men whose disabilities are presumptively connected under the provisions of the World War Veterans' Act and the War Risk Insurance Act.

"To establish a claim under the Emergency Officers' Retirement Act," the Director continued, "the former officer must show that he has a disability resulting directly from service and incurred in line of duty, or show that a disability which pre-existed his service as an emergency officer was aggravated as a direct result of such service and incurred in line of duty, and that such disability be rated in accordance with the Bureau's Schedule of Disability Ratings 30% permanent."

"The Retirement Act provides that its benefits shall be applicable to those 'who have been or may hereafter within one year be rated in accordance with law at not less than 30% permanent'. There has been considerable discussion as to the proper interpretation of the words 'who have been rated' many veterans believing they were to be automatically retired if they had ever been rated 30% permanent or more. The Comptroller General, however, has decided that 'It is apparent the intent of the act is that only those who have a permanent disability entitling them to a rating of 30 per cent or more under the schedule of ratings are entitled to retirement under the act of May 24, 1928, and if in any case the description of the disability upon which an award has been made by the Veterans Bureau suggests that the disability may now be less than 30 per cent, it is competent for the Director, in his discretion, to require the medical examination provided by the World War Veterans' Act in order that the rating accorded may be "in accordance with law." In order to determine finally under what interpretation of this phase of the law payments may legally be made, the Bureau has submitted the question of the retroactivity of this provision to the Attorney General and the Comptroller General.

"The interpretation of the words 'resulting directly from service,' as referring to the claimant's disability, is of cardinal importance to the former officer," continued General Hines, "as benefits under the Act may be granted or denied according to the interpretation determined upon, therefore, the Bureau has presented this entire question also to the Attorney General soliciting his opinion."

"The Retirement law gives the Emergency Officer a period of one year ending May 24, 1929, within which to apply for retirement and requires that the Bureau rate those entitled to retirement with pay in that period. This is a feature of the Act which does not appear to be generally known. Retirement pay is effective retroactively from the date of receipt of the application in the U. S. Veterans' Bureau, Washington, D. C., regardless of when the retirement is approved. In the consideration of these claims, a reasonable amount of time must be devoted to a detailed study of each to insure that complete justice is accorded the officer as well as the Government. Before this study may be made it is frequently necessary to obtain additional evidence such as a more detailed description of the disabilities and a separate report must be obtained from the War or Navy Department in each case. While the securing of such additional evidence necessitates some delay it has also resulted in retirement being granted in many cases which, lacking this evidence, would have been disallowed."

General Hines concluded: "The Bureau has adopted, insofar as the Retirement Act permits, the same liberal attitude which has characterized its administration of the World War Veterans' Act and other legislation for the benefit of the disabled veteran. While some important questions vital to the former officer are under consideration by the Attorney General and the Comptroller General, decision in cases contingent upon these questions, must necessarily be held in abeyance, but the Bureau's organization for the administration of the Act is such as to enable it to adjudicate all cases well within the statutory time limit. "In fact," said the Director, "it is anticipated that we will be able to dispose of all retirement claims before the expiration of the time allowed."

Anti-Militarism in Switzerland

A spirit of communism disguised in part as pacifism, socialism, and acute antagonism to the military establishment of the republic, has been gaining headway in Swtizerland ever since the close of the world war. Its latest manifestation is a publicly announced combination of teachers of the primary public schools of Zurich and Geneva having for its purpose propaganda advocating total military disarmament, abolition of the military budget, and inculcation of this doctrine in the minds of children attending the public schools.

In this connection, attention is invited to an article written by Lieutenant Frederick Brawand, of the Swiss army, which is published in the September 15 issue of the *Journal Militaire Suisse*, an extract from which is here given. What this officer has to say about anti-military propaganda in the primary schools applies not only to Switzerland but also to the instructors in some of our own educational institutions. Lieutenant Brawand says:

"A number of anti-military school teachers claiming to be actuated by 'love of the fatherland' demand the abolition of the military budget and complete disarmament of Switzerland. These persons also entertain the thought of calling into being an international anti-military association. These teachers, all of whom earn their stipends in the service of the state, are engaged in antagonizing that state. Are we to entrust our youths, the youths who will at some time become, as we are today, responsible for the security of the state? It is inconceivable that teachers who lay claim to be cultured and intelligent can publicly advocate such an absurdity. No one endowed in any degree with a rational mind will assert that our army endangers peace. It is the army that guarantees peace. Swiss neutrality has its only security in the army, and disarmament would jeopardize that.

"When Switzerland entered the league of nations it declared that it would maintain the invulnerability of its domains with its own resources and without foreign assistance.

Thanks to this declaration Switzerland is relieved from any action of the league of nations in its behalf. Maintainance of the army is for us, in our situation as an intermediate European state, a vital question. As soon as we are found incapable of protecting ourselves with our own resources the great neighbors of our immediate environment must, for their own protection, be prepared to take into their hands the strategic thoroughfares of our country. There can be no doubt of this and it ought to be comprehensible even to one who has no grasp of the military situation.

"The demand of the teachers of Geneva is plainly an attack against the security of the state. The teachers of Zurich declare, in a letter to their colleagues in Geneva: 'You indicate clearly and emphatically the incompatibility of war and the school.' This expression, which is one of many similar phrases uttered by them, has no sense of reason and is only evidence of means by which they endeavor to support their contentions. There are no schools in Switzerland where love of war is taught. If the teachers mean by 'war' recounting the deeds of our ancestors they commit a crime against our manhood. Youth has not only the right but it is its duty to know the history of our fatherland and that knowledge is incumbent upon them as a duty. To inspire love of the fatherland one must know the deeds of the men who built it up and handed it over to us. That is only one of the purposes of our schools. The schools must train true citizens of Switzerland and not youths devoid of all sense of home and of all knowledge of their country because its history is kept from them systematically by a dead silence in regard to all that relates to the struggles of those who rendered possible its existence, under the pretext that they must not be taught military history. The history of our country is sacred and if it is to endure the youths of today, the men and women of tomorrow, must have a clear comprehension of what the fatherland really stands for and must know that what they call the fatherland today is the gift of their fathers who protected this land with their bodies and acquired it with their blood. I need not allude to the hoary past to bring into light the deservedly disgraceful conduct of these teachers. . . . What must the more advanced of their pupils think of a teacher who antagonizes the institutions of the state. They are sowing the seeds of communism while they talk about love of country. They are undermining the faith that animates our children and teaching them that what the fathers did is reprehensible because they engaged in wars and engaging in wars is horrible. War is certainly horrible but the army is the only agency that can protect us from its horrors. Our army is an instrument of peace and its purpose is to maintain law and order. He who attacks it attacks the security of the state. We certainly have never had greater occasion to be gratified with having made timely provision for military preparedness than was the case from 1914 to 1918. Our army then saved us from foreign invasion and all its resulting horrors. . . . The problem for the government of a land like ours that is surrounded by warlike and war-conducting powers is, in time of war, the most difficult imaginable, and it is the duty of every citizen to yield his personal inclinations and interests to the common good. Switzerland must be ready at all times to defend its flag, the symbol of a glorious and honorable past."—G. R.

Motor Vehicle Driver's Licenses for Military Staff Officers

A writer in the *Militär-Wochenblatt* of October 25, 1928, has this to say on the subject: "The World War has been almost forgotten by the younger generation and many lessons that we might have learned from it have not been utilized. When we had penetrated Belgium by a three days' march we could see passenger motor vehicles which had been abandoned by the enemy standing about. How often these cars could have been made useful to us if we could only have found competent drivers for them. I was on the staff of a reserve division that was very sparingly supplied with passenger cars and we would have been very glad to have our supply of such vehicles increased, but among the officers with the staff not a single one had been trained as a motor vehicle driver. After hours of search through a war strength brigade we succeeded in finding two reservists who had

sufficient confidence in themselves to undertake to attempt to drive one of these abandond automobiles. It took them only ten minutes to get the car started and they continued to drive it for several days with great glee when they again abandoned it because they had found another which they liked better. I found this very mortifying and became then convinced that every officer of the higher staff grade ought to be required to possess a motor driver's license. During the progress of the war many young staff officers took it upon themselves to overcome the need of drivers by simply taking the drivers seat on a vehicle and going ahead, but this gave rise to so many break-downs that the supreme general staff issued stringent orders that no one should be permitted to drive a motor car unless he had a driver's license.

"The writer desires to invite attention to the embarrassing situation in which any officer using a motor vehicle for his transportation is placed when he is wholly dependent on the driver, if the driver is killed or wounded or becomes helpless in any other way. The use of automobiles has been greatly increased in the army since the war and modern war demands that every staff officer using one should be required to acquire a driver's license. Furthermore in view of the fact that large bodies of troops are likely to be transported by motor vehicles it is desirable that every officer should be a competent driver in order that he may be able, in an emergency, to replace a disabled car or truck driver, even momentarily. In order that all officers may be trained as motor vehicle drivers it is essential that all service schools be provided with automobiles and with competent instructors to teach drivers, and it should be required that competence as a driver be included in the officer's final examination.—G. R.

Insuring Secrecy of Confidential Documents

A writer in the October 25 number of the *Militär-Wochenblatt* states that, pursuant to an order of the Chief of Staff of the French army, all general staff officers must from this time on be able to use typewriting machines. By this they are to be made independent of the services of typists, male and female, and thus insure more fully the secrecy of general staff communications and reports. Secrecy of all documents affecting preparation for war is an obvious necessity. It is also indisputable that modern mechanical writing and duplicating appliances add increased difficulties to efforts for keeping writings secret. One or more generations ago, when everything was still written with the pen and every document had to be written over as many times as there were copies required, keeping the contents secret involved slight difficulties, but even the process of taking letter-press impressions increased the chances of contents of writings becoming known to persons not intended to be acquainted with them.

The German writer here enters into a discussion of measures that should be taken to ensure the secrecy of confidential documents from which the following extracts are given.

As a general rule only rigid, vigilant, and incessant supervision is effective in preventing betrayals of confidence in situations where dependence must be placed in individuals who may be subjected to temptations prompted by large pecuniary considerations, by threats of blackmailers who have succeeded in trapping and entangling their victims into compromising situations, and by other means. The assumption that an infrequent but unanticipated and unexpected surprise investigation is the proper expedient to ensure safety does not hold; it is evidence only of the carelessness of the supervising agency. Only systematic supervision regulated by frequency but not depending for its exercise upon any fixed dates of hours or days or opportunities prevents irregularities. Surprise actions succeed only in disclosing irregularities after the mischief has already been done.

Precautionary measures affecting persons preparing and handling confidential documents must be rigorous, uninterrupted, and have an element of distrust not only of invisible spies but also of the individual under supervision. The supervising service must also be

itself subject to supervision and there must be established everywhere the possibility of seeing that all rules for securing secrecy are at all times strictly observed. It is much more difficult to keep surveillance of the writing machine than of the penholder. The criminal expert may be able to determine that a document has been written by a certain machine but *who wrote the document* has been very seldom established. Typewriter carbon copies are especially dangerous; the carbon paper with which copies are made can also be the culprit; it now fills the role formerly taken by the letter press copy.

It is self-evident that trustworthy personalities are the best protection against the disclosures of confidential communications, but not everyone is an expert judge of human nature. Higher authorities must not content themselves with issuing orders and regulations to prevent disclosure of confidential documents, they must take measures also to see that those regulations are strictly observed and any violations visited with severe penalties.—C. R.

Electing to Fight

Hamilton Fish is author of the latest proposal that war be declared by popular choice. A constitutional amendment requiring a declaration of war to be ratified by the qualified electorate of the country has the fancy of Congressman Fish, who has put it up to the house. It is not a new idea among custodians of the peace. As an instrument for hamstringing the nation in an emergency the measure has been considered by pacifists.

It may be remarked that there is no machinery for a national referendum. The ballot is in the hands of the individual states, with the state legislatures alone empowered to call an election. Should congress declare war and look to the people for acceptance or rejection, some of the states might elect to vote on the matter, others might not. The presumption that at such a crisis none of the states would hesitate to furnish the avenue for popular expression has no value in the proceedings. The federal government would be extemporizing election machinery instead of looking to its defenses.

As a formula the Fish schemes are liable to superficial acceptance. The theory is that the people furnish the materials of war; let them decide whether they want to fight. Furthermore, it is argued that the time consumed in arranging for a referendum would serve to cool the passions and that several millions of people are less likely to be provoked into hostilities than a few hundred. If the declaration of war were ratified, it is further contended, there would be more whole-hearted support in the battle, once it was undertaken at the direction of the majority. These are assumptions founded upon the notion that the citizens of the United States are strictly logical persons, dictated by dispassionate values which will exist in times of high national excitement. This is not the case.

Actually the war fever of the electorate is higher and their spirits more volatile than that of their representatives. In any war which the United States may undertake there can be no doubt that under the Fish arrangement the majority would approve it. The only advantage would be an advantage to the enemy in a delay of mobilization and preparation when hours are precious. At such a time it is to be hoped that not America but the enemy is engaged in a referendum. While bombs are wrecking New York speakeasies it is not inconceivable that the Kansas assembly would be debating the calling of an election.

There are other considerations. In the event of popular ratification by a small margin the national dissension would be a serious obstacle to the efficient prosecution of war. A recount on petition of the minority is not unthinkable, and members of the minority would have some justification in claiming exemption from service on the ground that they voted no. A strong case could be made out for the rights of the minority.

Intelligent advocates of the popular referendum on declarations of war are confused in failing to appreciate the condition of the public mind when war threatens and in expecting too much of the ballot.—*Chicago Tribune.*

Nations as Policemen

While the United States is discussing the treaty renouncing war as an instrument of national policy, and considering a moderate cruiser program, a Vienna dispatch calls attention to the fact that ten small states of Eastern Europe have 1 million men under arms, and repeatedly several of them have been on the verge of war in the last year. Perhaps it is well to remind ourselves of the address of Theodore Roosevelt before the Sorbonne in Paris in 1910, which was read in the ceremonies at his grave on the tenth anniversary of his death:

> It is the duty of wise statesmen, gifted with the powers of looking ahead to encourage and build up every movement which will tend to substitute some other agency for force in the settlement of international disputes. The great civilized peoples must keep ever in mind that in the last resort they must possess both the will and power to resent wrong-doing from others. The men who sanely believe in a lofty standard preach righteousness, but they do not preach weakness, whether among private citizens or among nations.—*Kansas City Star.*

Now for the Cruisers

The multilateral treaty renouncing war as an instrument of national policy is one of a great number of pledges the United States has given of its desire for peace, pledges its acts have amply sustained. Its pacific disposition has not prevented other nations from making war against it. The nation's insurance of safety lies in adequate preparedness, and a navy as strong as the country's territorial and commercial necessities dictate is the minimum essential of adequate preparedness.—*New York Sun.*

Foreign Periodicals

Militär Wochenblatt, June 4, 1928

RANGES OF FIRE. By Lieutenant Colonel Benary. There is a tendency toward increase of range in all arms. One needs a long arm to seize the opponent opportunely in these days of marching and fighting formations echeloning in depth, but one frequently overshoots the target. Moral effect is balanced against and over actual effect and technical disadvantages. Moral success is undoubtedly greater when the range of our arms is greater than that of our opponent. We had proof of this at the beginning of the war in the West because the range of the French field guns exceeded ours. We artillerists stood helpless when their projectiles struck into our infantry and we were unable to touch the enemy batteries with our shorter-ranging guns. The actual effect of their fire was slight at those long ranges but the moral effect on our infantry was none the less greater and their censure of our artillery well justified. The Russians had the same experience when our projectiles reached them at ranges greater than that of their guns. The writer enters into details of changes in gun construction that are necessary to effect excessively long ranges such as increased weight of guns and carriages, increased length of barrels, and other things and argues whether or not the advantages of increased range so gained are not, at least to a considerable extent, discounted by the greater difficulties of ground observation of impact of shots fired at extreme ranges which usually overshoot the targets aimed at and cause but slight damage.

FORMAL DRILL IN THE GERMAN REICHS ARMY. A writer on this subject states opinion is gaining ground that former rigid close order drill in barrack yards, especially when required of soldiers of long service, does not conform to the manifold requirements of modern fighting methods and is a waste of time and should be replaced by training in loose open

order in terrain exercises. There is a division of opinion on this subject, but the reactionary supporters of continued close order drills, which they claim is the best agency for implanting in the man a proper sense and appreciation of discipline, obedience and soldierly bearing, are losing ground.

HORSE STATISTICS IN GERMANY. By "M. K." Notwithstanding the introduction and increasing use of motor power draft it is surprising to note, from statistics of a census taken by the national government, that the number of horses on hand December 1, 1927, was more than at the same date in 1913. The maximum was reached in 1925 and there has since been a slight annual decrease—from 3,916,000 in 1925 to 3,805,000 in 1927. But statistics of horses by ages show that the annual reduction for years to comes will be materially greater than it has been since 1925 because the census shows a very great preponderance of horses between 5 to 9 and over 9 years old. There were on hand at that date horses less than 1 year old, 129,000; between 1 and 2 years, 187,000; 2 to 3 years, 255,000; 3 to 5 years, 553,000; 5 to 9 years, 1,175,000; over 9 years, 1,503,000. This seems to indicate that horses now on hand that are approaching and have reached, and in some cases passed, the period of maximum serviceability will pass away much more rapidly than they will be replaced by younger horses coming on to take their places.

THE "REGISTER" OF THE NATIONAL GERMAN ARMY. (Reichswehr.) Shows the army as of May 1, 1928. Its distribution is: Two major army group commands, one in each defensive area, 7 division commands in defense district, 3 cavalry division districts. The army comprises 21 infantry regiments, 18 cavalry rgiments, and 7 artillery regiments. There are, in addition, 7 engineer (pioneer, sapper, miner,) battalions, 7 communication (intelligence) motorcycle detachments, 7 sanitary detachments, 4 schools of arms, 3 military smith instruction depots, 2 central and 1 auxiliary munition supply centers, and 7 ammunition supply establishments. The unusual preponderance of cavalry to infantry, as compared with armies of other military powers, is due to conditions imposed on Germany by the treaty of Versailles.—G. R.

Militär Wochenblatt, June 11, 1928

GERMAN MAJOR ATTACK IN MAY, 1918. By "105". Conclusion of an article on this subject begun in a previous issue.

TRAINING QUESTIONS. By Lieutenant General von Metsch. Continuation of his writings on this and kindred subjects begun in previous issues. Discusses in this number changes in conduct of operations in war since close of the World War due to improvement and development of fighting weapons and necessary changes in fighting methods resulting therefrom. Points out what he considers errors in fighting training systems now going on. He warns the commander of troops about to engage in an attack that he cannot count on being left undisturbed by his enemy during several hours of preparation in these days of air-observed long-range artillery fire, tank and airplane made smoke screens, machine-gun placements, gas, mines, all pushed forward with motor appliances. Only that method of managing an attack has value that takes account of all these agencies of enemy counter activities, even though it may be that enemy's plan to offer passive resistance to the main attack only. Tanks have long since ceased to be the *ultimo ratio*, the last deciding reserve of the leader. The modern fight stands in all its zones and phases, from advance long range reconnaissance to pursuit *in the sign of the motor.*

MODERN ARMAMENT AND EQUIPMENT OF THE INFANTRY. By Field Marshall von Ostrymiecz, former Austro-Hungarian army. The last war introduced a series of improved fighting appliances that training, armament and equipment must take into account. One of the most securely grounded rights is that of custom—being accustomed to a thing or manner of procedure. In ante war times the rifle of the infantryman was one of the most important questions of army armament. Designers and manufacturers of this weapon were continually engaged on its improvement and a rifle that had been in use as much as ten

years was considered antiquated and to be replaced. The infantry rifle with which nearly all armies entered the World War was, ballistically very efficient, had an average effective range of 2000 meters, and was capable of rapid fire. War experience showed that the attribute of accurate and rapid fire, although utilized to a certain extent, gradually became exceptional, especially in mass fire. Artillery and machine guns began to relieve the infantry from long-range fire and assigned them to rapid fire in mass in close combat action. Such it became in the war, and present conditions of weapon technique tends toward a fair probability that rapid infantry mass fire will, in the future, be limited to close combat, and achievement capability of the future infantry rifle will probably be founded on this phase.

The writer enters into an interesting discussion of the question of caliber, weight, length of barrel, and form and weight of bullets that will engage the attention of future rifle manufacturers. He touches also on the rifleman's other equipment—hand grenades, spades, steel helmets, gas masks, camouflage appliances—all of which are pressing for solution and arrives at the conclusion: In the search after new fighting means that shall substitute the machine for the man, it must not be forgotten that in all processes of mechanization the foot soldier is finally still the carrier of the fight who will bring the decision in future wars.

SUBSISTENCE SUPPLY OF THE GERMAN ARMY IN THE WORLD WAR AND THE PRESENT REICHSWEHR. By Colonel Benary. Measures for supplying a modern army must be as carefully considered as its military operations and care in this matter cannot be neglected in peace. An evidence of the excellent manner in which this problem has been and is being solved is presented by the "Exposition" "Supply of Reichs Army" now on exhibition in Berlin. In this "Exposition" the system applied in supplying the gigantic army of the World War naturally attracts the greater attention. We old front-line soldiers are reminded of the achievements of our supply organization which made it possible for every man of the army, from quiet rearmost rest stations up to the squad in a shell crater of the extreme front, to obtain necessary subsistence even though it may, in such instances, have been only a fist full of sausage and hard bread and a snifter of something to drink, and this in spite of all impediments including the starvation blockade to which our home regions and its people were subjected.

In comparison with army requirements of past ages attention is invited to the following figures of the quantities of subsistence supplies shipped from the home country to armies in the field during the war: 2,924,125 head of beef cattle; 1,122,296 sheep; 1,386,214 swine; 3,337,703 tons flour; 1,032,285 tons potatoes. All this aside from supplies of the same kind obtained from the countries occupied by the army and exclusive of immense quantities of dairy products, fresh and processed vegetables, fresh and preserved fruits, and delicacies sent from home by friends and relatives, supplies of malt, vinous, and other alcoholic beverages, canteen supplies, and the other minor components of the ration—coffee, tea, cocoa, sugar, salt, vinegar, etc., all of which came from home. The value of components of the daily ration allowance of the soldier of the present Reichswehr is 22.5 cents U. S. currency and of the bread ration 5¼ cents. The ration is computed at 3604 calories, compared with the World War ration of 3454 and the ante war ration of 2900 calories. The "thrown together" soldiers' meal of former times has disappeared and the men now are served soup, meats, potatoes, and vegetables in separate courses as neatly prepared and placed on the table as would be expected at any well-managed restaurant. Attention is also given to peculiarities of tastes of local regions of the country in preparation of cooked foods. The Wurtemburger may have his "spätzle" and the East Prussian his "Konigsberger klops."—G. R.

Militär Wochenblatt, June 18, 1928

THE FRENCH ARMY ORGANIZATION. By General von Taysen. Writer comments in considerable detail on the main features of the new French army reorganization the point

of departure of which, he says, is simply that reduction of the period of service of the enlisted soldier was a parliamentary exaction to which the government had to give way. The gist of his views is contained in the closing paragraph of his writing: "One thing is, at any rate assured: The one-year term of service does not prevent France from giving every man capable of bearing arms thorough training nor from bringing into action in war in a short time the maximum of military power that can, under modern circumstances, be brought to the assistance and support of the fighting army at the front. It is the key word of the French parliamentary circles and of the French press that: 'He who does not perceive that the French army serves only purely defensive purposes and is not capable of undertaking aggressive measures or measures tending toward conquest, is blind or malevolent.'" General von Taysen thinks that it would be easier to prove the opposite of this contention.—G. R.

Militär Wochenblatt, June 25, 1928

Crossing Rivers, Modern Processes and System of Construction. By Lieutenant Colonel Klingbeil. The form of fighting incident to forcing river crossings have undergone a change due to the effect of long-range artillery and the introduction of air observation into the fighting field. The element of surprise formerly played the main role on the part of the attacker, but this has, for reasons stated, been made much more difficult or almost wholly eliminated. There remains now only persistent and well-executed concealment of preliminary preparations and employment of strong forces to resist the enemy's measures for protecting the river banks. Crossing may be effected in daytime but actual construction of the bridge is restricted to night work. Rapid action is the trump card in all such enterprises. The writer discusses various methods for effecting crossings and the appliances required, which are now being studied and tested.

Training Questions. By Lieutenant General von Metsch. Writer in continuing his articles on this subject takes up in this issue "Modern Cavalry." "The publication of the excellent study of 'Army Cavalry in the War of Movement' by General von Borries was suggested by me principally because during my service as inspector I occasionally heard expressions of contempt for the achievements of the cavalry, as recounted in histories of the World War and a feeling of pessimism in regard to the future of the mounted arm, even from its adherents. That is not only unjustified but extremely detrimental to training. When young men growing up as prospective cavalry leaders are frequently told that their arm was only an out-of-date remnant of a fighting device that has seen its day, the effect cannot but be hurtful. Neither does one give encouragement by exposing the many disappointments disclosed by history that have been brought to our knowledge superficially only and without considering at the same time whether or not the failures of the cavalry concerned were due to deficient training or inappropriate and inadequate armament. One must also remember that in the last war, the war of position, continuing through several years, practically paralyzed the activities of the mounted arm." The writer refers to many instances when the cavalry of the allies as well as that of the central powers rendered excellent service in the war notwithstanding the disadvantages to which it was subjected. He also notes that the French have, in their new army reorganization, not reduced but increased the percentage of cavalry to other arms.

The New French Infantry Regulations. By General von Taysen. Writer takes up and comments on many details of these new regulations and finds in them, on the whole, progressive improvement. Among these he cites: "Above all the introduction of the machine-gun company has also experienced material change by reason of the increased accomplishment of the light machine gun; subordination of heavy machine-gun sections to the infantry, as heretofore prescribed, ceases. Since the new light machine gun has, as is assumed, the same qualifications up to 1200 meters as the heavy machine gun itself, an end is to be made of scattering the machine-gun company into parts and this company will, from now on, be used by the battalion for its own definite purposes—assembly and concentration of

strong fire power against fixed targets, long-range fire, indirect fire, etc." The writer also states that in some cases the new French regulations overcome faults and deficiencies in existing German regulations that he has heretofore had occasion to criticise.

RUBBER FOR SHOEING HORSES. By Lieutenant Colonel von Wolf. Great advances have been made in production and working up of rubber. This raises the question whether or not rubber can be used as a substitute for iron in horse-shoeing. Have any experiments in this direction been made? It would be of interest to gain information on this subject. The movement of horses on hard cement paved roads is becoming difficult and soft surfaced roads are becoming rare, and in war movement on hard paved roads will be much more frequent than they are in peace exercises. The advantage of rubber would result in sparing horses' hoofs and legs and in closer and better fitting from the veterinary's point of view.

In reply to this inquiry the editorial management submits the following: "In regard to the problem of hoof protection it may be stated that rubber horseshoe fittings were undertaken long before the war. A cast was made of the interior of the hollowed out hoof and a soft mass which soon congealed was pressed into this hollow. The hardened cast of rubber was then sent to a hard rubber factory which prepared from this cast rubber insertions. These were placed under the iron shoes and held fast to them by means of four iron plates projecting over the sides. The plates were extended under iron shoes and thus held fast the rubber insertions. The hoof irons were not complete iron shoes of the old pattern but hollowed out only underneath in U form. Into this hollow there was driven a short, well-tarred piece of cord so that the pressure on the horse's foot was comparatively softened and the inner hoof was also protected in mountain riding over rocky terrain. This process could not be applied to decayed frogs. For war purposes we naturally discarded this somewhat difficult process but were able to keep up valuable horses much longer, in peace, than would have been possible without it."—G. R.

Militär Wochenblatt, July 4, 1928

CONDUCT OF WAR AND POLITICS. In the leading article in this issue General von Kuhl, German army, retired, enters into an argumentative discussion of an essay published in pamphlet form by Professor Hermann Oncken on "Politics and War." The outstanding feature of Professor Oncken's work is his contention that when a nation is at war with another, politics, by which he means the civil administrative branch or department of the government as distinguished from the military branch, must step aside and give way to the military because war can be successfully conducted only by a military head charged with full power and responsibility—under one single head—a practical dictator as was the case with Frederick the Great, Cromwell, and Napoleon; that the civil (political) branch cooperates and places its resources at the disposal of the military but is in a sense subordinate to that in the direction of policies while the war is going on. It is conceded that the civil administration decides whether or not a war shall be begun and also when and how it shall end, but while war is in progress the military leader—naturally the chief of staff—should have control as representative of the sovereign or executive of the state. General von Kuhl takes the opposite view and holds that, especially in these days when war has become an affair requiring to the utmost every resource of the nation, the civil administration must have an equal voice in its conduct and policy while it is going on. In the course of his argument General von Kuhl gives publicity to many occurrences and incidents that arose on this very question during former wars in which the Germans were engaged, that have heretofore been unknown involving bitter and far reaching controversies between the chief of the German general staff and his assistants and the head of the civil administration of the government—von Moltke and Bismarck in 1866 and in 1870-71, and Ludendorf and Bethmann-Hollweg in the World War. Only a careful reading of the whole of General von Kuhl's writing, as published in this number of the *Militär Wochenblatt*, can furnish

an intelligent understanding of his views and arguments on the very important question under discussion which has not as yet been and probably never will be satisfactorily solved.—G. R.

Militärische und Technische Mitteilungen, May-June 1928

CAPTAIN ERNEST WISSHAUPT begins this number with an interesting article giving in narrative form an outline of the operations of the combined German and Austro-Hungarian forces against the Russians after the battles of Tannenberg and the Masurian lakes in East Prussia in September, 1914. In the opening paragraph he says: "Never was the element 'uncertainty' as greatly predominant as it was in the autumn campaign of 1914. Numerous interceptions of Russian radio messages were of great assistance in penetrating the veil but in spite of this the allied leaders were continually confronted by problems solution of which involved far reaching consequences. The picture of the enemy situation was subject to almost hourly changes."

COLONEL ALFRED VON DRAGONI, former Chief of the General Staff of the Austrian XII Corps, takes up, with a similar description, an outline of the operations of the Austro-Hungarian army in seizing and occupying the Russian Ukraine against the disorganized Bolshevic bands during the war, in the winter of 1917 and the spring and early summer of 1918. The territory covered by these operations extended through the whole of southern Russia, the shores of the Black sea and sea of Azov, beyond the Dneiper, and almost to the Volga. When, in the summer of 1918, the exhaustion of the Austro-Hungarian government foreshadowed its early breakdown and the troops were withdrawn, the whole region was again occupied by the Bolshevics. After the departure of the Austrian troops the struggle against the Bolshevics was again taken up by the so called "white Russians" under Generals Wrangel, Korniloff, Petlura, and others. The writer gives a graphic description of military operations of which very little has heretofore been known. The article is accompanied by an excellent outline map of the regions traversed by the contending troops.

CONSTRUCTING AND PLACING A BRIDGE OF BOATS over a river subject to flood high waters and making it available for three months' service during intervals of high, medium, and low water. This is given in the nature of a practical problem to be solved and worked out by a company of pontoon bridge engineers in a definitely fixed time. The proponent of the problem supplies a list of all the material that will be needed, the composition and distribution of the personnel of each kind to be employed in the construction with equations of stresses to which certain parts will be subjected, and working drawings in vertical, cross, and horizontal sections of portions of the structure while in process of construction, all of which is profusely illustrated in an appendix accompanying the article.

DEVELOPMENT OF ARTILLERY MATERIAL DURING AND SINCE THE WORLD WAR. Major Heigel, former Austrian Army, retired, continues in this issue articles on this subject which he began in the November-December 1927 number. He takes up in this May-June, 1928, issue the "Heaviest Guns on Gun Carriages in Fixed Positions." He states that this would include (if we exclude naval artillery) fortress artillery of inland fortifications and coast artillery but for his present purpose with reference to this article, his interest is only in such of the latter as can be made serviceable in land warfare, such as the 42-cm. coast howitzers and the 35-cm. guns used in the World War. Guns like the heavy high-angle fire cannon in movable carriages adapted to land warfare form today a separate class which, as long as the question of caterpillar artillery has not been solved free from all objections, predominate now as they have heretofore. The classification of the heaviest guns—used for siege purposes, we said, before the war—is quite new because mobility was limited to long-range guns of 15-cm. caliber. As a matter of fact, the probability of calibers over 15-cm. was found so difficult for solution that the French, Germans, and English placed such guns on railway gun carriages on the West front, which was practicable on account of the dense net work of railway lines there. Hence, we have now in all armies only a few of this class of guns whose application is possibly independent of railway lines. Of these, three among

modern guns are known to us: the Italian 152-mm., then our [Austrian] former 24-cm., and finally the 220-mm. French M 17—the 240-mm. St. Chaumond being classed as obsolete.

If, under the influence of change of points of view after the war we ask today the purposes of those guns, they would scarcely be classed as siege guns for modern warfare. We now need powerful long-range guns in order to be able to fire with readily movable cannon, that are not dependent on railway carriages, against vulnerable places far in the enemy's rear.

After these preliminary remarks the author enters into detailed description and discussion of the construction, character, and adaptability of heavy guns with comments on and criticism of their merits, weak points, and deficiencies and refers, here and there, to projects for their modification and improvement that are now in progress or contemplated. The text contains drawings showing details of construction of some of the guns mentioned and photographs of them in firing position and in place ready for being moved. Among the guns thus referred to are the Italian 152-mm. L/45 "*Sul Affusto A Coda*"; the Austro-Hungarian 24-cm. gun, M 16; the French 220-mm. gun, M 17, system Schneider, which is shown by four photographs and three drawings which Major Heigel says were courteously furnished to him by "Direction d'Artillerie, Paris, and by Messieurs Schneider & Cie."

Coming now to the United States the author uses the heading: *The American 16-Inch Seacoast Gun* and says: "It is not my intention to handle here seacoast guns but inasmuch as an exception has been made with respect to the American 40.6-cm. L/50 gun, I have departed from this course only because of a desire to indicate, by an example taken at random, what has been newly created since 1919 and also because, under the urgent pressure of war conditions, several of such very heaviest and presumably immovable seacoast guns were nevertheless sent to the front. Thus we [Austrians] placed the 35 Naval barreled "George" in position at Levico, with expenditure of very great efforts, in order to place the Italian corps headquarters under fire at Asiago in May, 1916. The Italians also had in readiness some very fine 38-cm. weapons at Ansaldo.

"The Americans were still building their heaviest disappearing guns well into the beginning of the war period. America was the land of disappearing gun carriages which are today doomed to extinction in this age of indirect fire and air observation squadrons. After the war they returned to the usual form of gun carriages—barbette they called them—and so evolved the 16-inch gun for protecting their most important harbors and the Panama canal, with the declared intention of exceeding in range all existing naval guns.

"That the Americans have succeeded in attaining their 50-kilometer range is largely due to the fact that they took advantage of the lesson taught by the Professor Rausenberger 21-cm. German long-range gun. By raising the elevation of their 16-inch gun to the maximum of 65° they send the projectile, in the greater portion of its trajectory, through the rarified higher atmosphere."

The author then gives a detailed description of the 16-inch gun and its principal characteristics, together with a photograph of the gun in firing position. To this he adds:

"There arises, in connection with this gun, for us also an important and interesting tactical question involving land defense. The gun stands wholly free and exposed on its traversing plate without armor of any kind. There are, for immovable targets, only two possible protections, armor or concrete or, still better, excellent camouflage. Since one intends or is compelled to dispense with the two first named there remains only the last. In most of the flat level surroundings of the emplacements for these guns it is practical to provide concealment for them from enemy fleet visibility by planting trees. The danger referred to applies to this gun and to every battery of its class with enemy fliers. How then, can this gun be camouflaged? A problem difficult of solution at a flat, level seacoast location. We can perceive, as far as is apparent to us from a distance, all the worries of seacoast defense but they are, nevertheless, confronting us with problems that are continually coming up to us in the field also—particularly with long-ranging cannon."

THE AUSTRIAN FEDERAL ARMY. M. Karl Vaugoin, the Minister for Army affairs, submitted to the parliament in February, 1928, a sixth annual report of his administration of the army. One learns from this report that the army is making satisfactory progress, notwithstanding budget retrenchments and the heavy restrictions imposed by the peace treaty. The relative number of officers is not greater than it is in other states notwithstanding the fact that a professional army needs more officers. In 1927 the army furnished troops to subdue disorders in the interior on three different occasions. It also rendered efficient aid in cases of conflagrations, traffic accidents, flood catastrophes, storm and tornado damages, earthquake, glacier and avalanche movements, and in other services for the common welfare, such as restorations after torrent overflows, construction and repair of roads and bridges, reforestation and drainage, services aggregating 123,000 working hours. Training is at a high standard. Building the pontoon bridge at Krems was a masterpiece of construction work, as was the laborious map work in the mountain regions. The relation of the army personnel to the population is the very best in all federal lands. Much progress is being made in placing soldiers, who have served their enlistments, in public civil service positions and also in promotion of the horse-breeding service. The minister alluded with trenchant criticism to the abusive attacks that have been made against the corps of officers of the army and emphasized again with glowing words the surpassing tradition of the old Austrian army and its renowned departed chief Conrad von Hoetzendorf.—G. R.

Rivista Aeronautica, September, 1928

PURSUIT PLANE, COMBAT PLANE, BATTLE PLANE. Gen. G. Douhet.

SECOND REPLY ON THE SUBJECT OF ARTILLERY AVIATION. Lt. Col. S. M. G. G. Castagna.

THEORETICAL AERODYNAMICS. Lt. Col. E. Raimondi.

THE POSSIBILITIES OF GLIDING FLIGHT IN THE ATTACK ON SURFACE SHIPS. Major V. Lega.

CONTRIBUTION REQUESTED OF AERONAUTS IN THE STUDY OF CLOUDS. Prof. C. Crestani.

AERIAL NAVIGATION INSTRUMENTS AND THEIR RATIONAL EMPLOYMENT. Engineer R. Ranalli.

THE 4-ENGINED SEAPLANE DORNIER SUPERWALS.

Rivista Marittima, October, 1928

TORPEDOES, TORPEDOCRAFT AND TORPEDO TUBES. Captain F. Costracane.

SUBMARINE CHASERS? Capt. I. Goiran.

TEST OF THE BALILLA CLASS OF SUBMARINE AT 100 METERS. Engineer A. Bezzi.

SURFACE TORPEDOCRAFT. Lt. Comd'r. C. Margattini.

VERTICAL AND HORIZONTAL PROTECTION OF VARIOUS TYPES OF WARSHIPS. Commander E. Bianco di S. Secondo.

Rivista Militare Italiana, September 1928

MILITARE NOTES ON THE MARECCHIA VALLEY. General Barbarich.

THE CROSSING OF THE TRENTINO ALPS BY PRINCE EUGENE OF SAVOY. Lt. Col. Pellegrino.

MOUNTAIN WARFARE. Major Scalise.

MILITARY CONSIDERATIONS OF THE ELECTRIFICATION OF RAILWAYS. Lt. Col. Stabarin.

Rivista Militare Italiana, October, 1928

A TYPICAL EXAMPLE OF A BATTLE OF PENETRATION: GORLICE-TARNOW. Colonel Trioli.

PREPARATION, STUDY AND DISCUSSION OF A REGIMENTAL TACTICAL MANEUVER PROBLEM.

MAY THERE STILL EXIST A BELLIGERENT RIGHT? General Bollati.

Rivista di Artiglieria e Genio, August-September, 1928

THE VISION OF FUTURE WAR. General Bollati.

LIMIT OF ERROR COMMITTED IN THE CALCULATION OF THE MOTION OF PROJECTILES BY NEGLECTING THE CONVERGENCE DUE TO GRAVITY. Prof. R. Serini.

FIRE AND MOVEMENT IN CAVALRY SCOUTING. A. P. Virex, Lt. Col., Holland Cavalry.

MILITARY TELPHER-WAYS. Col. A. Bellusci.

EMPLOYMENT OF A GROUP OF MOUNTAIN ARTILLERY ASSIGNED TO AN ALPINE UNIT. Col. V. Marango.

THE MECHANIZATION OF SAPPER-MINER AND TELEGRAPH UNITS wth reference to the technical maneuver in open warfare. Col. E. Cianetti.

NEW APPLICATIONS OF ELECTRO-MICROPHONE CIRCUITS. M. Conti.

MECHANICAL FUZES. Capt. M. De Angelis.

THE INTERNATIONAL RADIO CONVENTION OF WASHINGTON.

THEORETICAL CONSIDERATIONS ON THE CONSTRUCTION OF THE MUZZLE-BRAKE. L. Kazinczy.

NOTES ON THE DEFENSIVE ORGANIZATION OF THE VRIGNY-ANDRE SECTOR (Rheims, June-July, 1918). Captain G. Stellingwerff.

Revue d' Artillerie, September, 1928

THE COMBAT OF THE PETIT-MORIN (Continued). By Colonel E. Valarché, Retired.

THE ORGANIZATION OF ANTIAIRCRAFT BATTERIES—A critical study of the methods of fire. By Major P. Vauthier.

THE LIGHT HOWITZER IN FOREIGN ARMIES. By Major A. Pot.

THE MADSEN AVIATION MACHINE-GUN. By Major G. Morel.

A DEFLECTION ADJUSTMENT SCALE FOR UNILATERAL OBSERVATIONS. By Lieutenant P. Viry.

Revue d' Artillerie, October, 1928

THE WARS OF THE FIRST EMPIRE. THE WEARISOME PERIOD. By Colonel A. Grouard.

THE COMBAT OF THE PETIT-MORIN. By Colonel E. Valarché.

MEMORANDUM ON THE USE OF THE CORRECTOR IN FUZE-RANGE FIRING.

A DEVICE FOR SIMULATING ARTILLERY FIRE. By Major H. Viala.

Revue Militaire Française, September, 1928

THE BATTLE OF THE AVRE. By Major d' Argentieu.

THE ORIGIN OF THE NEW REGULATIONS OF THE MEDICAL DEPARTMENT. By Surgeon General Uzac.

CROSSING RIVERS IN THE PRESENCE OF THE ENEMY. By Colonel Baills.

A STUDY OF THE OFFENSIVE OPERATIONS ATTEMPTED FOR THE CONQUEST AND THE CLEARING OF THE GHOTO. By Lieutenant-Colonel Bru and Major Cortot.

THE CORPS OF THE ADMINISTRATION OFFICERS FOR THE STAFF AND RECRUITING. By Sanguinede, Administration Officer of the Staff.

Revue Militaire Française, October, 1928

THE BATTLE OF THE AVRE (Completed). By Major d' Argentieu.

CROSSING RIVERS IN THE PRESENCE OF THE ENEMY. By Colonel Baills.

GENERAL BRIALMONT. By Lieutenant-Colonel Mayer.

THE ORIGIN OF THE NEW REGULATIONS OF THE MEDICAL DEPARTMENT. By Surgeon General Uzac.

THE OPERATIONS ON THE BORI-GANOUS, SEPTEMBER 25, 1925. By Colonel Goudot.

Bulletin Belge des Sciences Militaires, October, 1928

THE OPERATIONS OF THE BELGIAN ARMY—THE ORGANIZATION OF THE ARMY DURING THE WAR.

A CATALOGUE OF THE FIELD ARMIES AND THE BELGIAN FORTRESSES IN 1914. By Lieutenant-Colonel B. E. M. Duvivier and Major B. E. M. Herbiet.

THE TANKS. By Major Lievin.

HISTORY OF THE ENGINEERS. By Lieutenant-Colonel Coppens.

THE MEETING ENGAGEMENT BETWEEN THE 3RD FRENCH COLONIAL DIVISION AND THE VI GERMAN C. A. NEAR ROSSIGNOL, SAINT-VINCENT, AND TINTIGNY AUGUST 22, 1914.

THE ORGANIZATION OF THE NATIONAL DEFENSE IN SWITZERLAND. By L'Armeé.

Bulletin Belge des Sciences Militaires, November, 1928

THE OPERATIONS OF THE BELGIAN ARMY—THE ORGANIZATION OF THE ARMY DURING THE WAR.

HISTORY OF THE ENGINEERS. By Lieutenant-Colonel Coppens.

A SCHEME FOR THE INDOOR STUDY OF PROBLEMS OF MACHINE-GUN FIRING. By Captain Ordies.

THE PREPARATION OF THE TELEPHONE-SIGNAL OPERATORS OF THE REGIMENT. By Lieutenant Yernaux.

THE TWO BATTLES OF THE MARNE.

THE ORGANIZATION OF THE NATIONAL DEFENSE IN SWITZERLAND.

I might tell you that I don't believe I ever stood up straight in my life until I took military training. I might tell you that it was as a cadet on long hikes that I first sensed great responsibility for the care of others under me. I might indicate that it was military training and athletic training which first developed my sense of the importance of human coordination and cooperation, of getting big things done by team play or mass work when they couldn't be gotten by individual actions. These are only a few of the great character lessons which may be garnered from the Military Department. I speak to you about them somewhat passionately because I know from personal experience what two years of elementary military training and two years beyond that can do for you.—Henry Suzallo, President of Washington University.

COAST ARTILLERY BOARD NOTES

Communications relating to the development or improvement in methods or materiel for the Coast Artillery will be welcome from any member of the Corps or of the service at large. These communications, with models or drawings of devices proposed, may be sent direct to the Coast Artillery Board, Fort Monroe, Virginia, and will receive careful consideration. W. E. COLE, *Colonel, Coast Artillery Corps, President, Coast Artillery Board.*

Project No. 666, Test of SCR 131 Radio Transmitter and Receiver.—The requirements of this set are that it should have a frequency range of 3960 to 4360 kilocycles and that it should be capable of operating up to a distance of five miles. It is intended as a replacement for the SCR-77-B in the Infantry regimental net and for the SCR-79-A in the Infantry brigade net. A test of the set is in progress with a view of determining its suitability for use in antiaircraft regiments.

Project No. 667, Motor Transportation in Antiaircraft Artillery.—This is a study of the transportation requirements of antiaircraft artillery regiments.

Project No. 668, Test of Wavemeter, Type 174-D.—This wavemeter is a commercial product designed to replace the SCR 125-A wavemeter which is now approved as a standard for issue but not for procurement. It is believed that the new apparatus should have considerable advantage over the SCR-125-A both in accuracy and stability of calibration. Test of the Wavemeter Type 174-D is under way.

Project No. 669, Comparative Test of Field Glasses.—Several types of field glasses, foreign and domestic, are being tested to determine their suitability for the service.

Project No. 670, Switchboard, Type BD-10 (Telephone, monocord, 8-line).—The question of the advisability of replacing the Switchboard Type BD-10, by two Switchboards, Type BD-9 (4-line monocord) or by one Switchboard, Type BD-11 (12-line monocord) was presented. The Board recommended that Type BD-10 be declared obsolete and that Type BD-9 be substituted for issue to antiaircraft searchlight batteries.

Project No. 671, Development of Motor Vehicles (one 3-ton six-wheel drive truck, single tires; one 3-tno two-wheel drive truck).—At the request of the Quartermaster Corps the Coast Artillery Board recommended that experimental vehicles to be purchased include the following features:

Body similar to the Class "B" cargo body.
Balloon tires—dual tires on rear of 3-ton two-wheel drive truck.
Towing pintle on rear of each truck; pintle or towing hooks on front of trucks.
Other features. such as size of tires, ground clearance, and mechanical details to follow commercial practice.

Project No. 672, Insulator, Type In-53 (Wooden knob).—Recommendation was requested as to whether or not the insulator, type IN-53 should be carried as "A" equipment to be used in the field, consideration being given to the needs of the Signal Corps and to other branches installing field telephone systems. It was recommended that the Insulator, Type IN-53 be carried as "A" equipment for all signal communication troops installing field telephone systems, and that so much of the Tables of Basic Allowances as pertains to "Insulators, wooden knob," remain unchanged.

Project No. 673, Issue of Car Jacks to Railway Artillery.—This is a study of the necessity for issue of journal jacks for each firing battery of railway artillery.

Project No. 674, Mounting of 75-mm. Subcaliber Mount T-3, on 16-inch B. C. Model 1919MI.—Drawings were submitted to the Board showing two mountings. In one of these the subcaliber mounting is to the rear of the 16-inch trunnions, and in the other the trunnions of the 75-mm. cradle and 16-inch cradle lie in the same vertical plane at zero elevation. The latter scheme is preferred, and recommendation has been made that a pilot model be constructed and subjected to service test.

Project No. 675, Spotting and Adjustment Board, 1928.—This instrument is designed to combine the best features of several spotting boards previously submitted for test, with a means for adjusting fire in both range and direction. A model is under construction.

Project No. 676, Elevating Mechanism, 12-inch Railway Mortars.—This is a study of possible improvements in present mechanism to permit more rapid elevation and depression. A 2-to-1 gear ratio superimposed upon the present elevating gear has been tried by the 41st Coast Artillery and 52d Coast Artillery. It was recommended that funds be allotted for purchase of four (4) pairs of steel cut gears to be applied to four mortars at Fort Eustis.

Project No. 677, Ammunition Service, 12-inch Railway Mortars (Overhead Suspension System).—An improved model of the overhead system for handling ammunition designed by Captain H. W. Ostrander, C. A. C., and successfully used in target practices at Fort Eustis, is now being installed on certain mortars at Fort Eustis for further test.

A few prominent citizens are making severe accusations against our new system of defense which betray an ignorance of the facts of our development. Typical of such statements is one to the effect that "the militarists of the nation are carrying on a far-flung campaign to Prussianize the nation. Our reorganization act seeks the same end that the German militarism sought—to make every male citizen of military age a unit of the war machine." I have no sympathy for such views, for the reason that they convey an insult to American manhood. There is an ingrained abhorrence of militarism in the minds of Americans, and it is absurd to assume that this can easily be removed. Those who cry out that contact of civilians with army officers will militarize the former should stop to think of what they imply. Even though our officers were seeking militarism—which they most decidedly are not—is our plane of intelligence so low that these few, a mere handful in the midst of the civilian population, can convert the millions to an abhorrent doctrine?—Secretary of War John W. Weeks.

BOOK REVIEWS

Principles of War Throughout the Ages (Des Principes de la Guerre à travers les Ages). By Major R. Van Overstraeten, Instructor in Military History at the Belgian War College. Brussels: Librairie Albert Dewitt. 1927. 6½"x 10". 2 v. with 150 separate maps. Ill. f 150.

This extremely interesting book is written in two volumes, the first beginning with Alexander the Great and coming down through the Russo-Japanese War and the second covering the World War. The 150 plates are adequate, but might be more useful if referred to in the text by number.

One of the reproaches that can be made to many French military historians is that they base their work on French and German sources alone, not being able to translate English and, in many cases, not considering that English or American sources would contribute anything of additional value. In this case, however, the bibliography includes many English and American sources, including the Official Report of General Pershing, the memoirs of Admiral Sims, and the writings of Admiral Mahan, the latter being referred to by the author as a "penseur d'élite."

No mention is made of the Civil War; as might be expected more than the usual space is given to the operations of the Belgian forces in the World War, including a spirited defense of the action of the King of the Belgians in concentrating the entire Belgian Army at Antwerp instead of attempting to reinforce the left of the Allied line, during the early days of the War.

Each section of the book, covering a war, a campaign, or a phase of a campaign, is divided into three parts; the first part gives the general situation with notes on organization and tactics, the second part gives a description of the events, and the third contains a number of observations by the author in the nature of criticism and lessons to be drawn. Of special interest to an American officer is the brief, but concise, analysis of the French tactical doctrines in vogue in 1914, which were faulty to the extreme and not based on any of the lessons that should have been learned from the Russo-Japanese War—particularly the effect of fire power, both artillery and automatic weapons.

It may be objected that too many of the observations bear on strategy rather than tactics; for example, in the period prior to and including the Battle of the Marne the observations cover principally the faulty distribution of both French and German forces and the lack of coordinated control of all the German Armies and fail to cover tactical lessons of great importance, such as the complete failure of the French Cavalry to fulfill its combat missions, due both to training and to tactical principles in vogue in 1914; it was not trained or equipped to fight dismounted and was not provided with sufficient fire power. This fact is admitted without reservation in the cavalry doctrine now being taught at the French Ecole Superieure de Guerre.

There is no index, only an outline at the beginning of the first volume; the French itself is not specially difficult although the military and technical term may require the use of a good French-English military dictionary covering all the military terms and expressions evolved during the World War.—J. H. C.

Without Censor. By Thomas M. Johnson. Indianapolis: The Bobbs-Merrill Company. 1928. 6"x 9¼". 411 pp. Ill. $5.00.

It is unfortunate for the reading public that propaganda and censorship are two of the necessary evils of war, but there is such a thing as public morale and where the truth will

not serve to build up or maintain morale the truth can not be given out. To be successful abroad the army must be supported at home and now that war has become a matter involving the whole nation it is more important than ever that the army in the field be not subjected to the notorious fickleness of popular fancy. Every student of history is familiar with the wave of despair or of gloom which is likely to sweep over the country after some inconsequential reverse, as that at Big Bethel in Virginia during the Civil War.

During the World War practically every bit of news that reached this country from the A. E. F. passed through the hands fo a censor. Soldiers submitted their letters unsealed before mailing, and all news stories were edited before being put on the wires. Even the official communiqués did not always tell the whole truth. Small successes were magnified and reverses were belittled or were not mentioned. There is therefore much that needs correction and there are many unpublished stories of what really happened in France.

From the summer of 1917 until after the Armistice, Mr. Johnson was the accredited representative of the New York *Sun* and followed the Army in all its actions. As with the other correspondents, he forwarded only such accounts as received the approval of the censor system, but he saw and heard of many things that were never published.

Now that the war is well behind us and further concealment of the truth could serve no good purpose, he gives us many uncensored stories of the A. E. F. In their preparation he has made use of his own material, but he has had access to many official records and has had the assistance of many officers, as Generals Drum, Fox, Connor, Sumerall, Kernan, Bullard, McGlachlin, Dickman, Menoher, Craig, Von Gallwitz, and others. His acknowledgements require five pages, so we may accept the accuracy of his narrative.

Some of the things he now brings to light are why the Americans did not exploit their success at St. Mihiel, the battles which we did not fight in Alsace and Lorraine, the conferences between Foch and Pershing in preparation for the last big drive, the results of the first day's fighting in the Meuse-Argonne, the matter of supplies and auxiliary services, the lost battalion, and the race for Sedan which caused such a row.

The account has been painstakingly prepared and is most interesting throughout. The book is profusely illustrated with familiar scenes which will recall to the reader many memories—pleasant and unpleasant—traffic jams, O. P.'s, Montfaucon, road dumps, rolling kitchens, trenches, and so on. In many respects it is the most important book of the A. E. F. which has appeared in several years.

James Wolfe: Man and Soldier. By W. T. Waugh, Kingston Professor of History, McGill University. Montreal: Louis Carrier and Co. 1928. 6¼"x 9¼". 333 pp. Ill. $5.00..

General Wolfe began his career at the age of fifteen, as an ensign in Flanders, and ended it at the age of thirty-two as Commander-in-Chief before Quebec.

Throughout that short career one predominant characteristic stands out—utter absorbtion in his profession. Also, he had luck. Luck and zeal alone would account for his rise in seventeen years from ensign to general. For, while he was handicapped by poverty and comparative social obscurity—considerable obstacles in the Eighteenth Century—competition was anything but keen. The average commissioned officer of those days was a pretty poor lot.

But Wolfe had more than zeal and luck. He had a sound mind (though far from a sound body), high courage, and a strong will. Also, he had quick decision. At Louisbourg he commanded the principal landing attack. Just before his boats reached the shore the French opened so heavy a fire that Wolfe saw a landing was impossible. He ordered a retreat. (Imagine being able to do such a thing in these days!) While he was pulling out he noticed that a few boats, which had gone astray on a flank, had blundered onto an undefended beach. Instantly he ordered a dash for that new landing place—and so pulled success out of failure. Here, of course, was luck; but also something more. As Professor Waugh so well puts it; "Every famous general in history has been amazingly lucky, be-

cause only a general capable of turning his luck to account can ever hope to become famous."

Wolfe's fame as a general rests only on the sieges of Louisbourg and Quebec, in the last two years of his life. At Louisbourg, Amherst commanded; and Wolfe's work, though highly creditable, was not solely responsible for the success of the British expedition. At Quebec, as Waugh frankly says, Wolfe never appeared to less advantage than during the first two months of that short siege. He was an ill man. He thought his career was ruined, and Waugh thinks he was even then dying of tuberculosis of the liver. But just as the siege was about to be raised at the approach of autumn, Wolfe undertook that "desperate plan," as he himself called it, by which he retrieved a campaign which was palpably failing—and won undying fame.

It was an extraordinary career. Seventeen years of nothing more than sound military ability; one short day of success so amazing as to rank him high among all military leaders, even had death on the battlefield not added a halo to his laurels.

For the landing at the Foulon and the scaling of the Heights of Abraham was much more than a "desperate plan." After a century and a half it still ranks as a masterpiece. Every factor of the military art is there. Secrecy, surprise, and simplicity stand out in perfection. All the preliminary movements by which his able antagonist (and his own blundering subordinates) were misled, all the details of cooperation with the Fleet, all the tactical arrangements were admirable. "Every joint of the machine clicked into its place," writes Professor Waugh, "and the whole ran smoothly and under perfect control from beginning to end. In those last hours of his life, Wolfe proved himself a master of his craft."

Three years ago a British officer, Lt. Col. L. H. Thornton, Director of Military Studies at the University of Cambridge, published a series of short military biographies called *Campaigners Grave and Gay*. In his essay on Wolfe, Colonel Thornton, following the lead of another British officer, General Mahon, discussed and apparently accepted the theory that Wolfe's landing at the Foulon was by pre-arrangement with some French traitors in high office at Quebec.

Professor Waugh does not mention this interesting theory, but his description of the corruption then prevailing among the French officials in Canada (Montcalm always excepted) makes it clear that such an act of treason might well have taken place. Even if this theory be accepted, however (and it rests only on circumstantial evidence), it would not greatly detract from Wolfe's fame. The perfection of his plan remains, and also its boldness. For how could Wolfe have known that the apparent French treason was not a trap.

Whether or not there was French treason, the only valid criticism of Wolfe's last operation is that he himself thought it a "desperate plan" in the success of which he seems to have had little confidence. Which may explain, while it also adds renoun to his insistance on leading his troops in person and being the first man ashore at the Foulon.

An admirable biography.—S. M.

The United States Navy. By Rear Admiral Thomas P. Magruder. Philadelphia: Dorrance and Company. 1928. 5¼"x 8". 179 pp. Ill. $2.50.

In writing for publication during the past year, Admiral Magruder made some statements and expressed some views which drew down upon his head Departmental ire. Not that he was ever publicly told so, but shortly after the publication of the views in question he was relieved of his command at the Philadelphia Navy Yard and placed on a status of "waiting orders" as an "administrative . . . measure."

From education at the Naval Academy and the Naval War College, from service through all grades from Midshipman to Rear Admiral, and from experience in two wars, Admiral Magruder is well fitted to make constructive criticism of the operation and administration of the Navy. This is the purpose of his book, which is a revision of his published articles. That some of his criticisms may be construed as destructive rather than constructive does not in any measure detract from the value of the book nor from the sincerity of the author's

desire to see our Navy second to none in power, equipment, and efficiency. Separate chapters are devoted to battle ships and battle cruisers, light cruisers, destroyers, submarines, and aircraft carriers. He argues that all these are necessary, that each has an important part to fill in naval warfare, but that the battleship is and must continue to be the deciding factor in battle. One may perhaps dispute some of his statistics and the aeronaut may even be willing to argue against his stand on surface vessels, but one can scarcely deny his general conclusions.

> Since the War of 1812, . . . it has been the policy of the United States Navy to arm its ships with the heaviest possible batteries. Let that policy continue and America will have peace and . . . be in a position to engender a spirit of good will throughout the world.
>
> The first line of defense is not the Navy. It is diplomacy . . .
>
> In the wars of the past the destroyer has played an important and spectacular part. In the next war, . . . the destroyer may have even a greater influence in the final decision of a war.
>
> The submarine has its functions in war ,and these are most important. At times, even, they may be indespensable. . . . In the center of these controversies always there is a rallying point, and that, in naval warfare, is and will continue to be the first battleship.
>
> The United States should spare neither time nor money to make its merchant marine at least the equal of that of any other nation. . . . the greatest of all pestilences—War!

The War In the Air, Vol. II. By H. A. Jones. New York: Oxford University Press. 1928. 5½"x 8¾". 508 pp. Maps. $7.50.

The War In the Air is the story of the part played in the World War by the Royal Air Force. Volume I was written by Sir Walter Raleigh, whose ideas are carried out by Mr. Jones, insofar as possible, in Volume II. written subsequent to Sir Walter Raleigh's death. It is to be presumed that other volumes are to follow from the pen of Mr. Jones, for in Volume II we do not find the end of the chronological account of the activities of the Royal Air Force.

The scope of the present volume includes, for the land operations, the Dardanelles Campaign and the Western Front from the winter of 1914-15 to the end of the Battles of the Somme in November, 1916. It includes the naval air operations in Home Waters to the end of 1916, and also, up to the same time, the activities of the naval air units from Dunkirk and Luxeuil.

In substance, the book contains some account of materiel development, somewhat fuller details of tactical developments, but in the main confines itself to the operations phase. The history is essentially one of the activities of the various units of the Royal Air Force. For each battle or phase, the assistance rendered by the components of the air arm is given in detail as to number and type of missions attempted, number and degree of successful missions, and the units concerned therein. As an authentic text for students of the past development of the air arm, or those interested in the activities of specific British air units, this book will be invaluable. The average reader will have one complaint. Mr. Jones is writing of what is considered to be the most thrilling development in the art of war. He narrates incidents of extraordinary heroism—but he does it in the calm manner of a man laying brick. One cannot but hope that perhaps on the next page Mr. Jones will use a superlative.

It is interesting to note in some detail the official attitude of the British army at the time toward antiaircraft. In this regard Mr. Jones states:

> This was not a Royal Flying Corps responsibility, but it was so intimately bound up with the employment of aeroplanes that the air story will not be intelligible without some account of the organization which grew up to the help of the air service. The antiaircraft shell may be likened to a fighting aeroplane which reaches its opponent

> in seconds rather than minutes. It has not, of course, the same certainty, but its moral effect was great. It tended to keep enemy pilots high up, harassed them in their work, had a heartening effect on the men on the ground to whom it gave visible protection, and, incidentally, signalled the whereabouts of hostile aircraft to friendly pilots who might be near. But most of all, from the Flying Corps point of view, was the fact that good ground defenses reduced the demands made on the aeroplanes for protection and so released them for their more urgent primary duties. . . . On the other hand, British aeroplanes at that time suffered far more from gunfire than from enemy aircraft.

The War In the Air is a complete picture, well painted, but it is a vivid subject and should be painted in more vivid colors.—B. F. H.

Practical Flying. By Major Byron Q. Jones, Air Corps, U. S. Army. New York: The Ronald Press Company. 1928. 5¾"x 8¾". 210 pp. Ill. $3.00.

Realizing that there is a growing demand for practical information on "how to fly" the author, who was one of the pioneer's of aviation, has endeavored to place his vast experience as an aviator at the disposal of the many ambitious students by compiling a training manual for airplane pilots. The author's claims that he has never been of the school that restricts flying as a mysterious art for *the chosen few* probably disqualifies his book with *the chosen few;* however, it should be, and probably is, accepted as an authoritive text by many aviation schools and instructors.

The first nine chapters are devoted to a discussion of the personal attributes desirable of a pilot. When the reader or student has completed these chapters he can pass on to the succeeding chapters with a confident feeling that he is or is not qualified to fly. The technical features of the airplane are very interestingly described in Chapter X, while Chapter XI acquaints the reader with flying parlance.

Beginning with Chapter XII the author makes each chapter a complete lesson in practical instruction to the student pilot. These lessons are put in the stimulating form of simple questions and answers that would naturally be asked by a keen student desiring to become a pilot. The lessons are arranged in progressive order from "the first flight" through the essential steps of ground instruction and air instruction to the "solo flight," including in all twenty lessons. Each of these lessons is short and simple, and is demonstrative as well as informative. The last five chapters touch upon the advanced courses of flying instruction.

It is this reviewer's belief that all amateur aviators could profitably procure a copy of this book in which can be learned a working knowledge of practical aviation which will assist them materially in any future study of the "art of flying."—J. L. W.

The Story of a North Sea Air Station. By C. F. Snowden Gamble. New York: Oxford University Press. 1928. 6¼"x 9¼". 429 pp. Ill. $7.50.

Here is history in its most readable form. We are indebted to Mr. Gamble not only for the collation of the interesting material of the book, but also for the delightful manner in which he presents it. Histories usually comprise the narration of a series of happenings without comment and without the human element. In this particular history we are given the series of happenings and, in addition, the very human thoughts and actions of the men who made the history. Heroism, tragedy, humorous incidents, and the actions of human beings are the spices spread over the facts to make a most delectable dish.

The title does not express the scope of the book. 'Tis true, it is a history of the Great Yarmouth air station, but in the development of that history there is included, in more or less detail, the entire development of naval aviation up to the close of the war, both British and German. For example, in narrating the story of a Zeppelin raid on England, Mr. Gamble

gives in detail the activities at Great Yarmouth incident thereto and, in addition, follows each Zeppelin back to Germany, regardless of its course over England, whether close to Great Yarmouth or not. One of the most interesting features of the book is the parallel historical account of the developments at Great Yarmouth and at the German seaplane and Zeppelin stations that opposed Great Yarmouth. He is aided in this by official German documents and by living members of Zeppelin's crews and seaplane stations.

We recommend *The Story of a North Sea Air Station* as a book that is of interest historically and one that is enjoyed from the first to the last word.—B. F. H.

Meet General Grant. By W. E. Woodward. New York: Horace Liveright. 1928. 6½"x 9½". 512 pp. Ill. $5.00.

General Ulysses S. Grant was an unremarkable man who had a remarkable career. His youth and his early manhood gave no indication that success in any line would ever come to him. His solitary boyhood, his early struggle, his indolence at West Point, his drinking, and his failures in civil life are too generally known to call for comment except in so far as they offer a contrast to his career during the Civil War and afterwards. That success and fame should have been attained after such a record is not necessarily to be considered remarkable, but that success should have come to Grant in the military profession under the circumstances is so exceptional as to justify an intensive study of his entire career. Not a military student, Grant became famous as a general. Hating war, he made an enduring place for himself in history through his ability as a fighter.

Mr. Woodward, in his study of General Grant has come close to what is probably a true picture of Grant the man and Grant the soldier, stripping away the legends and myths while recognizing the greatness. Yet, in his effort to lay bare Grant's shortcomings the author displays some of the iconoclastic tendencies which is characteristic of much of the modern biography. This is, no doubt, a reaction from the saccharine hero-worship of earlier biographers but it is being overdone in present-day writing. In an endeavor to picture the man and to distinguish between him and his reputation, his weaknesses and his foibles are over-emphasized at the expense of his accomplishments and his outstanding good qualities.

Still Mr. Woodward's book is interesting, comprehensive, and provocative of thought. In it General Grant stands out in bold relief, against an unusually vivid historical background. Incidentally, there is also a splendid portrayal of the people of the North and the South at war.

It is interesting to note that the author ascribes Grant's success to three primary factors —early training, superstition, and luck—although these are neither emphasized nor associated. During the Mexican War, Grant received invaluable training in logistics through his service as regimental quartermaster; the siege of Vicksburg, which made Grant, was mainly a problem in logistics. The superstition, which Mr. Woodward calls an obsession, took the form of an intense dislike of turning back or retracing his steps, this was probably what kept him going on to a solution of the problem at Vicksburg, saved him at Corinth, and carried him to victory on more than one occasion. Luck, which cannot be wholly eliminated from human affairs, may or may not follow the law of accidental errors, but it certainly compensated Grant in his later years for the low average of his earlier years. The goddess of chance joined him about the time he received his commission as colonel and remained with him to almost the very end.

All this is perhaps but another way of saying that General Grant seized his opportunity when it came and that he had the ability to carry himself successfully through the events that followed. Undoubtedly he deserves his reputation as a great general, and Mr. Woodward, while making him intensely human, shows him to be great. More than this, the author understands the general—a gift not possessed by all biographers. Of necessity, he

has brought into the picture other outstanding leaders of the period; and these have not in all cases been subjected to the same careful study and analysis and the author's comments and criticisms are not always based on facts as found by recognized military authorities.

For example, on page 102, Longstreet "was to become the best fighting general in the Confederate army and Lee's right-hand man." It is true that Longstreet was strong and able in certain tactical situations. Generally he demanded that his enemy be forced to fight at a disadvantage, but he failed Lee on three notable occasions and Lee never undertook to carry out such combinations using Longstreet as he did with Jackson. Longstreet was not in a class with Jackson.

Again, on page 202, the "war came to an end because Sherman had broken the Confederacy in two in his march through Georgia and the Carolinas" and because Grant had "opened up the Mississippi." Sherman failed in the primary mission in the Atlanta campaign—the destruction of Johnston's army. His march to the sea had no decisive influence towards the defeat of Lee's army. It was spectacular, but it sowed bitterness and hate and made reconstruction more difficult. On page 181 we find: "Next to Grant, he [Sherman] accomplished more than any other general in conquering the Confederacy." Sherman was one of Grant's ablest lieutenants when a corps commander and directly under Grant. Alone and independent he preferred to maneuver the enemy out of position rather than destroy him by hard fighting. With Lee as an antagonist Sherman would never have ended the contest as Grant did.

On page 253, the death of General Johnston is regarded as having changed the possibilities of success for the Confederate attack. When one remembers that Johnston had not organized a well-coordinated attack and was not personally directing and controlling his entire front, that when he was killed he was personally leading a brigade unit in a melee, it would seem that his influence on the final results would have been too limited to have changed the outcome.

Six Months With the Sixth Brigade. By Colonel Charles Crawford, U. S. A., Retired. E. B. Barnett. 1928. 5¼"x 7¾". 220 pp. $1.50.

This book will be a great disappointment to Colonel Crawford's friends and even to his relatives and descendants. It would have been better had he compiled this for his own family's archives, and even then a great deal should have been written more gently or entirely omitted.

It has no particular military value. Colonel Crawford hits every head in sight, often in fashion unworthy of him, and instead of the book containing valuable suggestions, critiques, and information such as might be expected of one with his training and ability and as he doubtless could submit, it is merely an argument that everybody was wrong, from the Secretary of War down, because he was relieved from command of a hard-fighting brigade while under fire. It is tragic that such a once capable officer, after long service, should for his own ends help the alibi seekers.—J. V. P.

Spies. By Joseph Gollomb. New York: The Macmillan Company. 1928. 5½"x 7¾". 389 pp. $2.50.

Probably no activity connected with warfare is held in greater disrepute than spying, yet spies have been used from the earliest ages. The penalty in time of war is death if the spy is caught in the act of espionage, but the penalty has never prevented the hiring of spies. The spice of danger is so attractive to certain types of character that in time of need there can always be found someone who is willing to match his wits with those of the enemy—and pay the penalty if he fails.

The difficulty of writing about spies is that they always work in the dark and even when they are apprehended much of their activity remains shrouded in mystery. Seldom does

the spy care to be known as such and it is unusual for him to talk about his operations, however successful they may have been. Occasionally some of the work of spies comes to light, and it is from such sources that the author has drawn his material and initiated his investigations.

Going back into Biblical days, Mr. Gollomb has collected the stories of the most brilliant spies of all ages. Some of the stories are already well known, as Moses' emissaries to the land of Canaan, Benedict Arnold, Nathan Hale, and Belle Boyd. The majority of the spies, however, are comparatively unknown.

Most interesting, perhaps, are the stories of World War espionage, and nearly half of the book is devoted to them. "England sets a Spy Trap" and catches Hans Lody and "A Netful of Spies." Louise de Bettignies was "The Spy Who Found High Adventure" in Belgium, and Mata Hari was "The Spy Who Danced Her Way to Death" for the Germans. The last chapter includes the stories of a number of "Spies Who Won."

The whole book is a collection of thrilling tales which offer many a dramatic situation made to order for use in imaginative writing.

Voltaire—Genius of Mockery. By Victor Thaddeus. New York: Brentano's. 1928. 6¼"x 9¼". 291 pp. Ill. $5.00.

The life of a fighter—a fighter hampered by almost every material and physical disability. But what a mind and what a spirit! "For more than eighty years the indomitable will-to-live which inhabits this frail human organism will hold it intact through sickness upon sickness, defending from the corruption of the grave the integrity of a glorious mind."

And with that brilliant intellect, perhaps the most fertile brain the world has known, went gaiety, wit, and a human touch to vitalize his genius. "Old in years, in gaiety, zest for living, above all hope, Voltaire has remained always young. For all his mockery and scepticism he dies convinced that the dark reign of superstition is nearing its end. 'You will see great days—you will *make* them'."

The story, in itself full of interest and inspiration, is very well told in this book. Frederick the Great, Voltaire's intermittent friend, comes in for a bit of character drawing which is excellent.—S. M.

The Confederate Privateers. By William Morrison Robinson, Jr. New Haven: Yale University Press. 1928. 6"x 9¼". 372 pp. Ill. $4.00.

The only value this book has is that it contains the record (largely derived from contemporaneous newspaper sources) of the comparatively unimportant operations, mostly confined to the first year of the war, of the Confederate privateers. These small ships raided coast-wise shipping, generally at no great distance from the Southern ports. Their operations had no effect on the war and were far less important than those of the blockage runners or the cruisers. The most interesting chapters of the book are those on the ram *Manassas* (privately built but operated by the Confederate Navy) and the early attempts at submarines.—S. M.

Sails and Swords. By Arthur Strawn. New York: Brentano's. 1928. 5½"x 8". 341 pp. Ill. $3.50.

A biography of Balboa. It claims to be the only one in the English language. At any rate it is a very readable one. It paints Balboa in glowing colors. It makes of his life a succession of amazing ups and downs, culminating in the final climax of his betrayal and execution at the hands of his enemy, the Spanish Governor.

The treachery and wholesale cruelty of most of the Spanish *conquistadores* are fully brought out in this book—largely throwing in relief the virtues of Balboa. It is curious

that they should have found dogs effective in fighting the Indians, as well as in torturing them.

The hardships endured by the early Spaniards on the Isthmus are almost past belief. And to the terrors of the climate to men in armor, to their complete ignorance of all sanitation, was added an appalling corruption in all forms of administration. No wonder they died like flies. The marvel is that they accomplished so much. "Spain: she makes men—and wastes them."

But if we may believe Mr. Strawn, Balboa was an outstanding exception in his day and generation. As a soldier, explorer, pioneer, and colonial administrator he appears in an admirable light. The description of his crossing of the Isthmus and discovery of the Pacific is most interesting.

He was a simple soldier-man, having little use for lawyers and such. "Most Puissant Lord," he wrote the King, "I desire to ask a favor of Your Highness, for I have done much in your service. It is that Your Highness will command that no Bachelor of Laws nor of anything else, unless it be of medicine, shall come to this part of the Indies on pain of heavy punishment which Your Highness shall order to be inflicted, for no Bachelor has ever come here who is not a devil, and who does not lead the life of devils. And not only are they themselves evil, but they give rise to a thousand lawsuits and quarrels. This order will be greatly to the advantage of Your Highness' service, for the country is new."

An interesting book.—S. M.

Desert Drums. By Leo Crane. Boston: Little, Brown & Company. 1928. 6"x 8¾". 393 pp. Ill. $5.00.

A volume of essays on the Pueblo Indians of New Mexico, pleasantly written, and illustrated with many excellent photographs. The author assumes the reader to have a general knowledge of the history of New Mexico and of the political aspects of Indian affairs; he does little to correct any existing deficiencies in these respects, but indulges in a running fire of comment on certain of the more interesting incidents. The book is in no way a reference text, and is informative only to a limited degree. However, many of the anecdotes recounted present graphic side-lights on a people of unknown antiquity, who were conquered by the Spanish long before Jamestown was first settled, who were ruled successively by Spaniards, Mexicans, and Americans, and who today bear less resemblance to the plains Indians than to the Igorote peoples of the Philippines.—F. M. G.

Elizabeth and Essex. By Lytton Strachey. New York: Harcourt, Brace and Company. 1928. 296 pp. Ill. $3.75.

This book needs no review. It will be read as a matter of course by all to whom biography and history appeal. And they will in no way be disappointed, for Strachey is still the unexcelled master of biographical portraiture done in superb prose. Here he has drawn a half-dozen of unforgettable characters, Philip of Spain, Burghley, Bacon, Raleigh, Cecil, and Essex. Best of all is the greatest of the Elizabethians, Elizabeth herself, that amazing enigma, compact of contraditions, who, with all her faults, gained both success and adoration—"Gloriana."

The book covers only the last sixteen years of the forty-five of Elizabeth's reign. It is to be hoped that Lytton Strachey will some day complete his story of the Queen whose character, far more complex than the head-strong Essex, gives full scope to his genius.—S. M.

Leonardo the Florentine. By Rachel Annand Taylor. New York: Harper and Brothers. 1927. 580 pp. Ill. $6.00.

Life and Times of Pieter Stuyvesant. By Hendrik Willem Van Loon. New York: Henry Holt and Company. 1928. 336 pp. Ill. $4.00.

The contrast between these two recent biographies is both sharp and interesting. Had Mrs. Taylor not been able to write so well, she would have written a better book. Her word pictures carry her away; her unusual facility in English prose overpowers the reader. It would not be polite to suggest that a lady might become intoxicated on words. But in this case it seems a pity that so interesting a subject in the hands of so erudite an authoress could not have been graced by a little more simplicity.

Mr. Van Loon's style is the exact opposite—journalistic, snappy, modern, eminently readable.

Both books deal with time and circumstances rather than with their heroes. But what a contrast! The beauty and the brilliance of the Renaissance in the one; the rather sordid squalor of New Amsterdam and the petty commercialism of Holland in the other. Only in his chapters on the explorations for a Northeast Passage does Van Loon come into the scope of real adventure or romance. And where could one find greater contrast than between the almost superhuman Da Vinci and the all-too-human Stuyvesant?

But both of these books are excellent in their different ways. One deals with a relatively simple subject in a direct and simple style—and with the affection of a compatriot. The other paints the gorgeous canvas of the Renaissance in all of its own sumptuousness.—S. M.

St. Nicholas Book of Science. By Floyd L. Darrow. New York: The Century Company. 5″x 7½″. 324 pp. Ill. $2.50.

The author is science editor of *St. Nicholas* and has taught science, written several books on various phases of science, and is generally familiar with developments in scientific fields. In this book he has prepared what may well be called a yearbook of science, for he covers all fields in a chronological rather than a classified order. No event has been too small to be recorded, and no field related to science has been overlooked.

Transatlantic telephone communication, television, astronomical discoveries, anthropological developments, the Mississippi flood, the isolation of illinium, use of ethylene gas in ripening fruit, aeronautical progress, protection against poison ivy, steel manufacture, bird migration, the talking movie, numerous scientific expeditions, the X-ray, Hertzian waves, cosmic rays, invisible light, some great engineering projects, radio photographs, and the new cathode ray tube are a few of the many subjects discussed. The language is clear, graphic, and entirely non-technical and can readily be understood by young boys with an inclination toward science. In general, each subject is treated historically and the objective, value, or use of the particular development is indicated. Although the book was written primarily for young people, adults will find it a valuable survey of recent scientific achievements. A carefully prepared index augments the value of the book and permits of its use as a reference work. A very useful book.

Warpath and Cattle Trail. By Hubert E. Collins. New York: William Morrow and Company. 1928. 6¼″x 9¼″. 296 pp. Ill. $3.50.

In 1883, as a boy ten years of age, the author spent many months at his brother's ranch in Oklahoma. The ranch houses stood on the old Chisholm Trail from Texas to Abilene, Kansas, near its crossing over the Cimarron River, then known as the Red Fork of the Arkansas. Practically all of the cattle driven through the Indian country from Texas passed over the Chisholm Trail, and the author had opportunity to observe cowboys, Indians, bull whackers, mule skinners, sheep men, and a few desperados during a part of the most impressionable period of his life.

The story is a record of life and events as he saw it or heard of it at first hand. It contains much of interest, but it is, not unnaturally, a trifle disappointing. With a boy's

irrepressible curiosity, he sought the whys and wherefores of everything he saw, and it is of these things that the book deals. His field of observation was, unfortunately, the restricted field of youth and he gives us no particular background. Geographically, he can not get far from the ranch.

The Indians he meets and learns to know are, for the most part, Cheyennes and Arapahoes. Playing, as he did, with the Indian children of his own age, he saw the red men and red women as fathers and mothers and found them tolerant, kindly, and humorous. The reviewer never had intimate knowledge of life in the Indian Territory, but the similarity between the conditions and the people he knew in the Sioux country and those reported by the author leads him to commend the book, as does Hamlin Garland in the foreword, "to those who share the increasing interest in *Americana*."

Short Story Writing. By Mary Burchard Orvis. New York: The Ronald Press Company. 1928. 5"x 7½". 291 pp. $2.25.

After a number of years of experience in teaching story writing to university extension students in evening classes and in home study courses, the author, who is Assistant Professor of Journalism at Indiana University, has prepared this volume to give practical help to those who wish to write stories. There is, naturally, much of the orthodox in what she has to say. No book on the writing of short stories could omit a discussion of the importance of clarity, the nature of the short story, the source of plots, character depiction, atmosphere, setting, and all the other angles of imaginative writing, and these are all discussed in proper sequence and in well-balanced proportion. The new note—and one which is frequently overlooked or subordinated by teachers—is the importance of psychological and sociological study of humans as a source of character material. This is stressed—rightly, we believe. No writer can create a convincing character if he fails to understand the motivating influences which make humans the queer beings they are. The author suggests that the fiction writer should know at least the fundamentals of Freudianism. Behaviorism, as taught by Watson, might be of more practical benefit if one can believe that we are environmental products.

As examples of typical short stories, the author reproduces "The Killers," by Ernest Hemingway, "The Doll's House," by Katherine Mansfield, "Six Dollars," by Wilbur Daniel Steele, "Quality," by John Galsworthy. "The Father," by Björnstjerne Björnson, "The Birthmark," by Nathaniel Hawthorne, "The Cask of Amontillardo," by Edgar Allan Poe, "The Adoption," by Guy de Maupassant," and "Moonlight," by Guy de Maupassant.

Written clearly and simply and with a good index, this volume is one of the best on the subject of short story writing.

A West Pointer's Honor. By Major Alexander W. Chilton. New York: Harper and Brothers. 1928. 5"x 7¼". 267 pp. Ill. $1.75.

The author's service at West Point as a cadet and as an instructor has given him an insight into cadet character which make his stories seem real. In the present volume a cadet, true to the Academy code, sacrifices himself for a comrade, with an outcome far more favorable than he had any right to expect.

Cock Pit. By James Gould Cozzens. New York: William Morrow and Company. 1928. 5¼"x 7½". 302 pp. $2.50.

A dramatic story centered in the sugar industry of Cuba and the more-or-less open warfare of great corporations.